

MUNICIPAL JOURNAL AND ENGINEER

Copyrighted, 1902, C. M. Palmer, New York

VOLUME XIII

NEW YORK, NOVEMBER, 1902

No. 5

NEW CITY HALL FOR GREATER NEW YORK

The Suggestion of the Municipal Art Society to Improve City Hall Square—City Pays a Fortune for Annual Rent—Much Could Be Saved by Erection of Building Large Enough for All Departments

By the Editor

THE growth of American municipalities is one of the marvels of the New World. Each decade in the last fifty years has presented some new problem for immediate solution. Vast sums of money have been appropriated and more or less wisely expended. The improvements have followed so rapidly that it is not at all surprising to find that many egregious blunders have been made in the leading cities. The civic authorities have built in haste to repent at leisure. It will take more than twenty years to undo some of the mistakes made in ten, and in some instances the evils cannot hope to be eliminated within three generations.

The first practical steps toward civic improvement were made in the streets. Good pavements were sought after everywhere. Large sums of money were expended for this form of improvement and not always wisely. There are many cities to-day which are paying interest upon a bonded indebtedness created thirty years ago for street improvement, and while the improvement has disappeared the interest bearing debt remains. If necessary, a score of notable instances could be named. Sanitation came up next for consideration. There was less money wasted in this field, largely due to the nature of the problem. It was one which could be handled only by

engineers and was therefore more often wisely carried out. The creation of parks, playgrounds, public baths, and the like, have in their turn occupied their fair share of public attention and support. But not until quite recently has the subject of municipal art received the attention it should from the hands of civic authorities.

New York was the leader in this movement, as it has been in most other reforms in civic improvement. It was the first city in the United States to have a Municipal Art Society, whose membership included many public spirited men and women, whose sole object has been to bring about, by practical methods only, the adornment of the city. Fortunately for the civic life of the country, the idea was widely copied. At the present time there is scarcely a city of any size which does not possess a society with a similar object for existence. Chicago, Philadelphia, Boston, Baltimore, St. Louis, and scores of others, including many of the smaller cities, towns and villages, are blessed with civic improvement enthusiasts.

New York has much upon which to congratulate itself in this direction, but there is a vast amount of work which yet remains to be done. While large sums of money have been employed to adorn the city,



SUGGESTION FOR NEW MUNICIPAL BUILDING
Courtesy Municipal Affairs

and while the motives have been unquestioned, the improvements and expenditures have not always been wise. In its architecture and development, New York is a hodge podge. It lacks uniformity, except in ugliness. There is only here and there a corner that has been improved, and that not always in the best manner. Before any further efforts are made in this direction, simply as a

study English and European civic conditions, before any plan shall be marked out, would command the approval of every one interested in the future development of the metropolis of the New World. President Cantor of the Borough of Manhattan, recently called attention in one of his reports to the need of such a commission for his borough, at the same time suggesting that it would be wise to have such



matter of economy and as a future safeguard thrown around the appropriations to be expended for the beautifying of the city, a comprehensive plan of Greater New York should be evolved by a commission made up of specialists in their several lines of civic development. This would cost thousands of dollars but during its execution it would save many millions. Therefore the wisdom of appointing such a commission, and sending it abroad at public expense to

a commission appointed for Greater New York. Let us hope that public opinion may be aroused to that pitch where it will demand the appointment of a commission for that purpose.

Among those who are most deeply interested in this general subject is Mr. Charles R. Lamb, who, by education and training, may be considered one of the foremost experts in all matters of civic improvement at the present time. He it was who originated the idea of the

Dewey arch. As far back as 1899 he submitted a plan for the general improvement of City Hall Square and vicinity, which included the erection of an immense building for the housing of the various departments of the city government. He pleaded for the assemblage of these various departments upon the ground of general economy, and the plan which he submitted at that time was shown to be feasible. In describing his plan for the benefit of "Municipal Affairs," published by the Reform Club, of which he is a member, and the chairman of the Committee on Public Art, he said:

"In any consideration of City Hall park, the conditions as they are, and as they undoubtedly will develop in the immediate future, must be reckoned with, and not conditions as we might wish them to be. The press has lately discussed the advisability of increased connection with this section of the Borough of Manhattan, by bridges across the river, or by tunnels underneath. It is unnecessary to take either side of the controversy. Bridges we will have, and tunnels, too; and there will be more and more facilities for bringing an ever increasing number of people to this same small area, and thus the business of the city will become more and more congested here. The city, as a municipality, must recognize this fact, and prepare at once for the increased congestion that inevitably will come in the very near future.

"At present our old City Hall is entirely inadequate for its purpose, if that purpose is to be more than to house the offices of the mayor, be the home for the council and the assembly. This building is one of the few municipal buildings which is, architecturally as well as historically, worthy of preservation; therefore, of these suggestions, the primary one would be the retention of the present City Hall, and its renovation by eliminating from it all the minor city departments, and restricting the building simply as it should be, to the mayor's office and the two houses of legislation.

"The affairs of the city are so multitudinous, and by consolidation in Greater New York the work has increased so much in detail, that it necessitates a very large amount of room for the efficient working of the various departments. This office room is now secured in many buildings in and around the City Hall, and in other sections of the city. The buildings in the City Hall park are entirely inadequate, many of them old and antiquated, and the newer ones badly designed, and illy considered for their work.

"My suggestion, therefore, for the treatment of this 'Open Space' is practically two-fold. First—To remove all the buildings in the park, excepting the City Hall, thus adding very much area to the space at our disposal. Second—As the municipality is now erecting a Hall of Records on the eastern end of the block north of the park, from Chambers to Reade streets, that it also condemn the western end of the block, which includes the old Stewart Building, where the comptroller's offices now are.

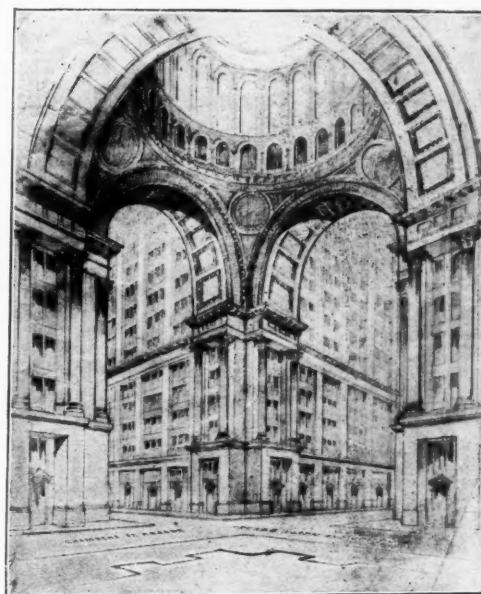
"This would be a convenient site for a monumental building tall enough to dominate its locality, in which tall buildings are already crowding. No structure can economically be built on a small area, and therefore in the planning of this, the City's 'Syndicate' Building, I have assumed a space, as deep north and south, as the distance from Broadway to the new Hall of Records. This would reasonably provide room for all city offices that within the next twenty-five years should be accommodated here.

"To secure this depth, the building would have to be located on its southern line in the northern part of the city, while its northern line would be on Reade street; and Chambers street, as a great arcade, would pass directly through the center. The street would be absolutely uninterrupted. The amount of space thus taken from the park is NOT as GREAT as the amount of space gained by the proposed removal of old buildings. Moreover, as will be seen by the plan, the

park spaces as rearranged, are much more advantageous and effective.

"The distance through the building (450 feet) would give a series of stories perfectly protected from the weather and which would be especially desirable from this one cause alone. This street arcade, running east and west, would be crossed by another arcade running north and south through the center of the building, opening from an imposing entrance facing the City Hall. At the crossing of these arcades a great dome would be erected, which, although under the large central tower, would be perfectly lit by the four courts. This dome would add greatly to the effect of the arcades and permit of views of the interior from the various office floors.

"A monumental entrance has been designed for the southern facade facing into the park, thus giving direct connection to the City Hall and with the new Federal law courts (the old Post Office). Grand entrances are also suggested on the Chambers street arcade, on Broadway, and on the east, adjoining the Hall of Records, as well as on the north of the building, facing Reade street. These entrances are the centres on each side of the grand colonnade on the exterior of the building. This would be built on the present house line, and, carried to the height of one hundred feet, with its frieze and entablature, would form the lower level to the architectural



ARCADE, NEW MUNICIPAL BUILDING†

composition and could have as much sculptural enrichment as could possibly be desired.

"The roof of this colonnade would 'step' back to intersect with the main wall of the building, which would rise two hundred and fifty feet from the street level. The main facade would be broken by corner towers, and by one in the centre on each side. These, continued an extra fifty feet in height give a rampart effect to the central group formed by the four great towers 450 feet in height, which fill the angle corners of the inner section, and buttress effectively the central tower rising 200 feet higher to a height of 650 feet.

"With these eight exterior towers, and connecting wall, the four inner towers, and the central one, a composition of mass would be secured, crown-like in effect, and so large and impressive that it would dominate lower Manhattan, and help fuse into a single whole the tall buildings that are rapidly being erected about this site. The effect from the lower bay and our rivers, and from the opposite shores, would be remarkably impressive, and for the closer view details could be made as artistic as desired.

"Lower New York has become more congested within the past ten years than ever before, and has either built, or is now building, or has projected, more tall business buildings than all that have been built elsewhere up to this date. Whether these modern engineering constructions are liked or not, their presence must be accepted, and the possibility of their rapid increase considered. Under the stimulus of the consolidated business of Northern Europe, in the Hanse towns,

* The portion of this article quoted from Mr. Lamb is the substance of an address delivered by him at the December, 1899, meeting of the National Sculptors' Society in New York. It was one of a symposium by several specialists upon the general subject of municipal art as applied to New York. Mr. Lamb took the subject which everybody else refused to discuss, and his suggestions were well received. The matter of housing all the departments of Greater New York has again been brought forward in connection with "The Memorial of the Municipal Art Society relative to proposed changes in and about City Hall Square, New York City." A digest of this Memorial is given in this article, and we are indebted to the committee for several of the illustrations used.

† By the courtesy of the Editor of *Municipal Affairs*.

the great warehouses, shops, and office buildings show the extreme development of timbered construction. In this, the nineteenth century, under similar conditions, the steel construction, which has replaced timber work, shows its most extreme development. The steel cage, with its exterior coating of stone, marble or brick is akin to the great wooden timber buildings, with their walls of filled-in brick between the timbers; and the later buildings are as much stronger than their earlier prototypes as is the steel girder than the oak beam.

"When it is considered that such a building would involve no engineering difficulties; that the plan of which it is a feature would actually increase the free park area; that, so planned, it would provide the greatest possible amount of well-ventilated and well-lighted room at the least possible rate of cost; and that in addition convenience would be subserved by grouping together these offices and departments now widely scattered—there seems no reason why a city, borrowing money at three per cent. interest and already owning half the site needed, should not house itself at a cost of thirty cents a cubic foot, instead of paying rent which makes it profitable for others to borrow money at four and five per cent., and purchase land in this very locality, and build thirty story buildings at a cost, for building alone, of more nearly forty cents a cubic foot.

"Could our civic pride have a grander monument? Do not economy and convenience alike demand that this—or some better plan—be carried out at once?

"Any idea for the rearrangement of City Hall park would be incomplete that did not suggest and advocate artistic treatment of the Brooklyn Bridge entrance. The present arrangement is most unsatisfactory and should be modified at an early date.

"A monumental entrance should be so planned as to give a view through it of the piers of our great bridge. It should be, as it is, axial with Murray street on Broadway, and when the smaller buildings in the park have been removed as above suggested, it would be seen from this distance. The treatment should be such as to be both monumental and dignified, and the approach should not begin on the east side of Centre street, but on the park edge itself, as does the present landing for foot passengers, crossing the street by arches. We have now at this point a commonplace iron staircase with an elevated bridge leading to the bridge cars. Why could not this temporary structure be replaced by something which would be in itself a thing of beauty, and much more practical and efficient from a utilitarian point of view?

"We claim to be practical people. Are we as practical as we claim, if we continue to do the business of our great city very much on the lines, and with the same methods, and even in the same inadequate quarters, as did our fathers and our grandfathers before us? No one connected with the present or preceding administration of the city, in their private capacity, would think of continuing their own business on similar lines. Why is it not possible when considering public affairs to advocate the same breadth of vision as would be shown if the matter under discussion were personal?"

Quite recently this same idea of a new City Building has been brought forward by a special committee of the Municipal Art Society and presented as a Memorial to the Board of Estimate and Apportionment of New York. The committee is composed of Mr. Calvin Tompkins, Chairman of the Committee on Parks; Mr. Charles C. Haight, Chairman of the Model City Committee; and Mr. Charles R. Lamb, Chairman of the Committee on Thoroughfares. Its proposed changes in and about City Hall Square are advocated upon much the same grounds advanced by Mr. Lamb in 1899.

Briefly, it calls attention to the fact that the present City Hall occupies a dominating central position of Greater New York. It em-

phasizes the inconvenience, not only to the officials but to the general public, in having the various departments located in different parts of the city. It also shows the lack of economy in paying enormous annual rents for buildings for the accommodation of such departments, which could be avoided if adequate space were provided in a municipal building similar to the one proposed.

Taking these conditions into consideration, the members of the committee recommend: First, that all buildings except the City Hall and the County Court House be promptly removed from City Hall Square; Second, that the ground area of the County Court House be not enlarged as suggested. This building, incongruous in design and taking up park area which should have been left, will become more of an obstruction as the result of any attempt to enlarge it. Third, Assuming that the property bounded by North William, Park Row, Chambers and Centre streets is to be taken for bridge approaches, this committee distinctly advises that the property situated between Chambers and Reade streets, extending from the new Hall of Records to Broadway, be also condemned. The offices now located in the existing buildings on this site can be immediately utilized for municipal purposes at a distinct saving in rental to the city.

"The city," according to the report of this committee, "unmindful of its interest and dignity, is now paying over \$300,000 annually, to private parties for office requirements, the demand for which is annually increasing. On a 4½ per cent. basis (three per cent. for interest and one and a half per cent. for taxes lost,) it must capitalize this sum in property investments to the extent of say \$6,600,000, or be at an annually increasing loss and inconvenience. The Legislature has already authorized the expenditure requisite for providing increased room for the Courts; and plans indicating, we believe, an outlay of from two and a half to three million dollars in altering and extending the County Court house have been formally submitted to and rejected by the Municipal Art commission. Any solution of the transit problem at the bridge entrance, of necessity involves the condemnation of private property to the extent of over a million and a half dollars. After utilizing this for bridge approaches, the upper stories could be used for city offices and to the extent of such availability will save rent elsewhere. The city, consequently, is so situated that it can advantageously spend approximately the following amounts, namely:

| | |
|---|--------------------|
| For office building and land for same, say..... | \$6,600,000 |
| For special court purposes, say..... | 2,500,000 |
| For land in connection with transit facilities, say..... | 1,500,000 |
| Construction of such elevated surface and subway connections with the bridge as may be determined upon, say | 1,000,000 |
| | <hr/> \$11,600,000 |

"The problems here presented can be faced in two ways. One is to 'potter' separately with each detail and this has been the course so far followed in regard to City Hall Park since 1865, the result being an expensive and incongruous medley of buildings which the city has outgrown, which now constitute a serious hindrance to free movement, and which by their obtrusive ugliness continually offend the public taste. The other is to anticipate needs, to lay out comprehensive plans, and then systematically to carry them out. The peculiar condition surrounding the transit problem, the necessity for housing the City government, together with the now unimproved condition of the property sought to be acquired, make it comparatively simple to put such a plan into execution at this particular time. In the near future these conditions will so speedily change that what at present is easy of accomplishment will soon become difficult and expensive."



ROAD BETWEEN NEW YORK AND CHICAGO

Two Officers Make the Trip to Chicago in an Automobile—Municipalities Along the Way Lend a Hand—Much of the Proposed Route Is Already Improved

*By Arthur H. Battey**

AFTER considerable discussion in advance, and the receipt of favorable expressions of opinion from many well known men, the New York and Chicago Road Association was formed at a meeting held at the clubhouse of the Bar Association of New York, on the evening of Monday, June 16, 1902. The objects of the association, as set forth in the original plan, were the furthering of the project to build a continuous highway between the commercial capitals of the Atlantic Coast and the Great Lakes, by means of co-operation with town and state authorities, to outline and urge legislative action as well as individual effort in that direction, and to raise funds through membership fees with which to carry on the work of propaganda. With the idea of including everyone interested in the membership list, the entrance fee was fixed at \$1, which carried also a subscription to the official organ, and other privileges, among which were membership in the League of American Wheelmen, and the Highway Alliance. The list of founders included Col. Albert A. Pope, Lieut. Governor Timothy L. Woodruff, of New York, John B. Uhle, President of the Highway Alliance, Col. Wm. L. Dickinson, of Springfield, Mass.,

clusion was arrived at that the best method of arousing enthusiasm and getting the project before the people in a manner which would be productive of results by means of a trip by representatives of the Association over the proposed route. The International Motor Car Co., placed a Toledo steam wagon at the disposition of the association, and on Friday, September 5, Col. Dickinson and Mr. Boardman started on the journey, with George Soules, an employee of the Motor Car Company, as chauffeur. The start was made from the Fifth Avenue Hotel, New York, the finish being at the Auditorium Annex, Chicago, late on the afternoon of Saturday, September 27. The route, which led through Tuxedo, crossing the Hudson at the Fort Lee Ferry, took the travellers to Kingston, as the starting point on the westward course, thence through Delhi, Binghamton, Owego, Elmira, Hornellsville, Jamestown and intermediate points to Erie, Penn., Ashtabula, Cleveland, Elyria, Fremont, Toledo, and Bryan, Ohio, Goshen, Elkhart and South Bend, Ind., around the foot of Lake Michigan to Chicago.



A GOOD ROAD AND TWO BAD ONES ENCOUNTERED IN NEW YORK STATE

F. C. Donald and Burley B. Ayres, of Chicago, T. J. Keenan, of Pittsburg, Penn., Winthrop E. Scarritt, Wm. S. Crandall, Lee C. Boardman, George R. Bidwell, and Arthur H. Battey, of New York, and W. A. Howell, Milo M. Belding, Jr., and H. L. Perkins, representing the League of American Wheelmen. These men constituted a Board of Trustees, which organized by the election of Colonel Pope as president, Mr. Uhle, first vice-president, Mr. Boardman, second vice-president, Mr. Dickinson, treasurer, and Mr. Battey, secretary.

THE AUTOMOBILE TRIP TO CHICAGO

After the outlining of a route which would pass through the southern tier of counties in New York state, thence by way of Erie, Penn., taking the most feasible route to Chicago, the development of the plan was left in the hands of an executive committee, and the work of securing support and subscriptions was begun.

It was soon found that the project was one in which more people were interested than had been supposed, and the con-

This trip was undertaken to let the people, on the line proposed, know that there was something being done by the new association, and to find the most feasible way of connecting the scattered lines of good roadway along the route, than to begin the actual work of building. It proved to be an object lesson of no small value. In this connection an extract from the final report of the second vice-president as to the results may be of interest. He says:

CITIES AND TOWNS HELP THE MOVEMENT ALONG

"This initiative trip of road experts was just the one thing needed to draw the attention of the public to the necessity of a combined effort to build a road that would be an object lesson, and an incentive to a greater exertion on the part of legislative bodies to further action in providing for common highways. No greater evidence of this could be given than the awakening this trip has caused along the entire route. At every town the officials, boards of trade and other organized citizens eagerly greeted the road men and proffered their personal and official services to aid the movement that was so surely to benefit their own locality. It seemed to them that it was a matter of local pride that they should not be behind others in the movement.

To mention any town as being in advance of the others would be

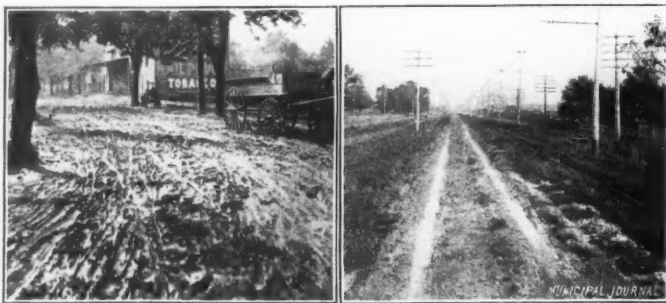
* Secretary of the New York and Chicago Road Association, Tribune Building, New York City. Those who wish to secure further information about this association should address the secretary. The membership fee is \$1.00 a year, which should be sent to the secretary.

unfair to the others, because, without an exception, all were in earnest, and, unless the movement so auspiciously begun is allowed to wane, the trip just finished will be the precursor of the greatest movement for highway improvement that this country has ever witnessed.

The people are thoroughly aroused to the needs of good roads, as well as to the great benefit of a continuous highway that would be good in any weather or season of the year.

GOOD ROADS THROUGHOUT NEW YORK

In the opinion of Col. W. L. Dickinson, the treasurer of the New York and Chicago Road Association, the route is entirely feasible. Throughout New York State he found abundance of good road material lying near the roadways. In Ohio and Indiana, where there was a lack of gravel or stone for building roads, he remarked on the great amount of crushed stone ballast used in the construction of the



A BAD STREET IN AN OHIO TOWN

A BAD ROAD EAST OF CLEVELAND

trunk railroads. If the railways could procure it, surely the common road builders could do the same.

"While New York possesses an advantage over other States by its wealth and possibility of granting larger appropriations, Ohio and Indiana are not entirely out of the running. There are two incentives to these commonwealths building good roads. The closest to the people is the change of the country school system that is now more far reaching than is generally known. It is the custom to have in a township a schoolhouse in each of the four corners of the town. Each building costs about \$2,000, and there is the expense of heating and maintenance, besides a teacher, for about an average of seven pupils. A central school is used instead, with fewer teachers and more pupils in a class, thereby affording better facilities for instruction and with the result of a better grade of pupils. They are brought to the school in wagons, where there are good roads. The latter are a necessity.

THE ROAD WILL BE COMPLETED IN THE NEAR FUTURE

"The idea promoted by the New York and Chicago Road Association has taken such deep root that nothing seems possible to arise that will stem the tide in its favor. It is not a faraway look to consider that its consummation will be within a few years, when the road will be constantly travelled by vehicles of all descriptions. On the wayside will be located well kept inns, where supplies will be provided for travellers.

"In travelling across the country the lack of intelligent information of either direction, distance or condition of the roads, is perplexing, and a guidepost at the intersection of crossroads would greatly aid the traveller. No matter how good the roads may be constructed, unless a proper maintenance is kept up they will deteriorate and disintegrate. This condition is noticeable, and to improve it will require a great deal of education on the part of the supervisors."

The odometer attached to the wagon registered 1,086½ miles of travel, which included about seventy-five miles used in taking on water and photographs of the roads. These photographs will be used as stereopticon illustrations for a series of lectures which the association is planning to give in the towns and cities along the route during the winter months, as a preparation for active work in the coming spring.

Since the formation of the association several changes in the board of directors have occurred, causing some changes in the plans and details, which are not of a nature to have any effect on the results to be obtained or the work planned save in minor details. One of these changes was caused by the officers of the League of American Wheelmen deciding that they were unable to carry out the arrangement by which membership in the association carried with it membership in the League. This placed the Road Association squarely on its own foundation, and has been no detriment, so far as has been seen. Another change was made necessary by the resignation of Mr. Uhle, first vice-president, from his office and his place on the board of directors. This left the brunt of the work on the hands of the second vice-president, secretary and treasurer, who have carried it on to the present stage. A plan is under consideration now for reorganization and incorporation, leaving to the members the selection of a board of trustees and officers, and giving the organization a legal standing. Whatever else is done, the New York and Chicago Road Association does not intend to let the matter drop. It was organized to get an improved highway between New York and Chicago, and if the expressions of support so far received are carried out it will accomplish its object at a date which may through its nearness, be a purpose to those who have smiled at the idea.

CINCINNATI'S MUNICIPAL ART SOCIETY

THE city of Cincinnati has cause to congratulate itself on possessing such a patriotic body as the Municipal Art Society. This was modelled after a similar society in New York City, and has been doing work as valuable as that of the parent organization.

The Cincinnati society was started through the Chamber of Commerce and, like the New York society, requires that the mayor be one of the trustees. Its purpose is "to provide appropriate sculptural, pictorial, or other decorations for the public buildings and parks in the city of Cincinnati, and otherwise to encourage high artistic standards." After it had shown what was its object, and had established its reputation, it secured the co-operation of the city authorities.

Among the many things that it has done for the betterment of the city was the decoration about the main entrance to the city hall. An appropriation of \$2,500 was made for the purpose; \$200 to be paid to the artist submitting the most appropriate design, \$100 as a second prize and the remainder for the work of putting up the decorations. There were ten competitors for this work, coming from Boston, New York, and Philadelphia, and the judges were Mr. Charles R. Lamb, of New York, Frank Duvaneck, of Cincinnati,

and T. C. Steele, of Indianapolis. The prize went to a New York man, and his artistic decoration on the wall is a strong contrast with the showy figures in the stained glass windows in the rest of the building.

A couple of years ago the Board of Public Affairs wished to clean a large bronze fountain situated in a prominent square. A cleaning had been ordered by the Board a year or so before when a scrubber was ordered to restore the fountain to its original brassy polish. Fearful that the same method would be pursued this time, the Society asked that the cleaning of the fountain be left to it. Under its guidance only the dust and smoke were removed, and the greenish-black tint natural to the metal, was allowed to remain. The most ignorant critic did not dare ask a return to the former condition of brassy brightness.

One of the recent efforts of the Society has been directed toward securing more artistic signs and the suppression of the billboard nuisance.

Success has met its efforts, and enterprising manufacturers have asked the Society to design for them artistic sign boards, and in each case the result has been an ornament to the city.

AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS

Many Valuable Topics Discussed—Digest of Leading Papers—Splendidly Entertained by Rochester—City Engineer Rust, Elected President—Next Meeting at Indianapolis

For the first time in the history of the organization, the American Society of Municipal Improvements was entertained at the home of the president. For this reason the cares of the president, Mr. E. A. Fisher, City Engineer of Rochester, were increased, as it has been the custom to hold the entertaining city largely responsible for the programme and the success of the meeting. Mr. Fisher rose to the occasion and gave the visiting delegates not only a warm welcome but the best meeting that has ever been held. Including the reports of the standing committees, there were about thirty topics for discussion, most of which were presented by the authors. If anything, there were too many topics brought up to do any of them justice.

The real value of the work of this organization is not to be questioned, but there is no doubt that much more lasting results would be obtained if the papers could be printed from two to four weeks prior to the annual convention and distributed among the members and delegates who signified their intention to be present. This is the method adopted by the best organizations of the kind. Its advantages are readily apprehended. The thing that stands in the way of following such a method is the fact that the members of this organization are all exceedingly busy in the summer, just when the papers would be prepared for the annual convention. It has been said that if this method were made the rule, there is some doubt whether members could be persuaded to prepare articles for discussion. Inasmuch as such a proceeding would necessarily reduce the number of topics to be discussed, it is not improbable to suppose that if the matter were vigorously pushed it could be achieved. The result to be gained would seem to warrant such an effort at any rate.

The hospitality extended by President Fisher, Mayor Rodenbeck and his associates, the Board of Trade, and other citizens of Rochester, was all that could be desired; every delegate was made to feel thoroughly at home. The entertainment provided for the visitors was so arranged that all could obtain a fair idea of the beauties of Rochester. Interspersed with the solid work of the convention, there was arranged a trolley ride for the ladies and a tally-ho ride for the gentlemen, around the city, including various parks and principal streets, and, on Thursday evening, a banquet, at which several leading Rochesterians were called upon to address the delegates. Taken as a whole the meeting was a great success.

Unusual attention was given to the question of street and highway construction. The chairman of this committee, Mr. N. P. Lewis, Chief Engineer of the Board of Estimate and Apportionment of Greater New York, arranged for a symposium of articles upon the

general subject, which included State Engineer Edward A. Bond, who told how the highways of the Empire State are improved; Hon. W. E. McClintock, Chairman, Massachusetts Highway Commission, who described the methods of improving and maintaining the highways of his state; "The Cost of Pavements and Roads in Small Towns, by City Engineer Steece, Burlington, Ia.; "How to Minimize the Injury to Pavements from Water," by Major J. W. Howard; "A Year's Experience in Laying Bituminous Macadam,"—a paper prepared by Mr. Fred J. Warren of Boston, and read by his brother, Mr. George C. Warren, of Utica, N. Y.; "The Use of Wood Pavement Under Heavy Traffic," by F. A. Kummer, C. E., of New York City. Considerable attention was given to the question of sanitation, sewer construction and maintenance.

As the County of Monroe, of which Rochester is the capital, under the operation of the Higby-Armstrong Act, has completed or has under construction over fifty miles of improved macadam highway, the delegates had a rare opportunity to examine improved roads several years old, those just completed and those under construction. Deputy State Engineer, William Pierson Judson, was present and took particular pains to show the delegates the methods employed by the engineering department of New York State in the construction and maintenance of highways.

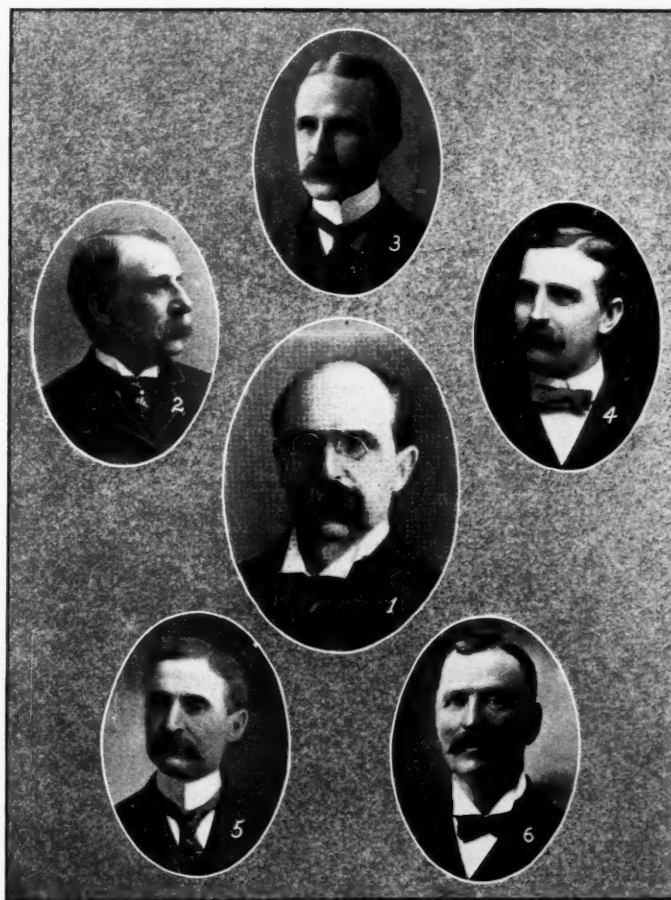
The following officers were elected for the ensuing year: President, Charles H. Rust, City Engineer of Toronto; first vice-president, G. M. Ballard, Newark, N. J.; second vice-president, A. P. Folwell, Consulting Engineer, Easton, Pa.; third vice-president, Edward Logsdin, Board of Public Works, Indianapolis, Ind.; secretary, G. W. Tillson, Chief Engineer of Highway Department, Borough of Brooklyn, N. Y., and treasurer, P. J. O'Brien, Oswego, N. Y. The members of the new Finance

Committee are: Emmet J. Steece, Burlington, Ia.; Fred. Giddings, Atchison, Kan.; J. M. McCartin, Commissioner of Streets, Birmingham, Ala.

Mr. George W. Tillson, of Brooklyn, N. Y., secretary, and Mr. P. J. O'Brien, of Oswego, N. Y., treasurer, were the only officers re-elected. The success of any organization depends largely upon the efficiency of the secretary, which is particularly true of this society. The proceedings must be edited with great care. Besides, there is a large amount of correspondence to be carried on during the year. For all this Mr. Tillson is eminently fitted and the society is to be congratulated upon retaining his services.

The next meeting will be held at Indianapolis, Ind.

A digest of the leading papers and reports are given below.



OFFICERS OF THE SOCIETY FOR 1903

1. C. H. Rust, president. 2. George M. Ballard, 1st vice-president. 3. A. Prescott Folwell, 2d vice-president. 4. Edwin D. Logsdin, 3d vice-president.
5. George W. Tillson, secretary. 6. P. J. O'Brien, treasurer

THE NEW YORK HIGHWAY COMMISSION

The Work Should Be Increased—Relation of Good Roads to Tenement House Problem—All Classes Favor Betterment of Highways

*By Edward A. Bond **

WE are working in this state under what is known is the "Higbie-Armstrong Act" whereby the state pays fifty per cent. of the cost of the roads, the county thirty-five per cent. and the towns fifteen per cent. Under this act no portion of the State's money can be expended within the incorporated limits of a city or village.

AREA, POPULATION AND VALUATION

Our State has an area of fifty thousand square miles, being fifty-seven counties outside of the city of Greater New York. In these fifty-seven counties there are 929 townships, with substantially 75,600 miles of highways. St. Lawrence county has the greatest area and the greatest number of miles of highways, being 2,880 square miles with the same number of miles of highways, equalling one mile of highway to each square mile of area. Rockland county has the least area, being 208 square miles and has the least number of miles of highway within its boundaries, namely 350.

We have forty-two cities within this State with a total population of 4,900,000 and 424 incorporated villages with a total population of 700,000, leaving a rural population of 1,700,000; the total population of the State being 7,300,000, or substantially one-tenth of the total population of this country.

Up to the present time the State has appropriated for the building of highways, under the Higbie-Armstrong Act, \$1,465,000, and this money has been expended in the construction of 121 roads, in twenty-three counties of the State, covering 355 miles. In addition to the money already appropriated by the State, on October 1st, nineteen counties had voted their half of the money for the construction of an additional 214 miles of road, half of the cost of which was estimated to be \$834,727.50, making a total of 177 roads, in twenty-four counties, covering 569 miles, and it is my belief that before the adjournment of the next Legislature the amount voted by the different Boards of Supervisors of the several counties of the State will reach \$1,500,000.

As heretofore stated the State of New York has an area of upwards of fifty thousand square miles within which there is roughly estimated to be 75,600 miles of highways. By a careful analysis of the situation it has been found that about one-tenth of the highways are what would be termed important thoroughfares; or those which should first receive permanent improvement.

If the whole population of our State was assumed to be classed in families of five and the full area of the State divided equally among the families, it would give but a 22-acre farm to each family or a piece of land being substantially 979 feet square. If we should construct one-tenth of the total miles of highway of this State it would cost substantially sixty millions of dollars, which, if raised on bonds running seventeen years at three per cent. interest and money apportioned pro rata in the different counties according to their assessed valuation, would make a county tax of only \$1.02 per \$1,000 and a State tax of thirty-six cents per one thousand dollars, or a total of \$1.38 per \$1,000, for the term of seventeen years, when both the principal and interest would have been paid off.

RELATION OF GOOD ROADS TO TENEMENT HOUSE PROBLEM

For the last half of the past century our minds have been occupied by the construction of a complete system of railroads throughout all of the States of the Union and the building up of large manufacturing interests of various kinds. From Dewitt Clinton's time until recently, the people of our own State have been more or less absorbed in the question of the improvement of our transportation facilities by means of canals and various waterways. The new century, however, is bringing us face to face with new conditions. The State of New York contains the largest city on this hemisphere; and in addition to this, we have throughout the State upward of twenty cities of a population of more than twenty thousand each, with

wealth and intelligence unequalled in any other country of the world; and at this time many great minds, both in the business and religious divisions of the country are centered upon the effort of solving the problem of the differences between labor and capital. This truly is one of the most important questions to be solved in this or any other country.

The query now is, if the permanent improvement of the public highways of our State is not one of the means of settling, or at least helping to adjust this difficulty. The location of large aggregates of capital at any one point either in the commercial, manufacturing or other lines requiring employment, tends to the congestion of population at these points and heretofore has resulted in a poor system of tenement houses which invite danger at least to the moral sentiment of the community. This cankerous influence upon the minds of the young is of such vital importance, that the means to offset or obviate it cannot be lightly thrown aside.

The last few years, and especially the last four or five years have shown remarkable developments in the way of a system of electric railroads traversing all of the suburban districts surrounding many of the cities of this State. The wealth of this State, as I have mentioned, is such that we not only *can* afford to have improved highways, but it places us in the position where we *cannot* afford to go without them.

The highest type of mental culture and development throughout country districts cannot be attained without means of easy and rapid communication. There is no doubt but the railway and telegraph are the great modern civilizers of the world, and up to the present time have done more than any other one thing to permanently hold this nation together; but they are limited in their spheres of usefulness because they do not reach the farm, the home, the country school house and church. The common road is the connecting link between these. Without this Good Road progress of the widespread civilization must of necessity be greatly retarded.

RURAL FREE MAIL AND STATE BOND ISSUE

The rural free mail delivery, which is becoming so popular throughout the whole country, would be extended by reason of better roads. The greater part of New York State is so diversified and beautiful in natural scenery and surroundings that not only the wealthier classes but also the people of moderate means are led to select homes in the country and make them permanent; and no one thing tends more to increase the beauty and comfort of a rural home than a perfect highway which can be traversed through storm or sunshine with perfect safety, either by the ancient horse and chaise, the more modern turnout of the well to do merchant or successful farmer, to say nothing of the indispensable American bicycle or the elegant automobile, whether the latter be a "White Ghost" or a "Red Devil."

My belief is that the time has passed wherein we need to cultivate public sentiment as to the necessity of improving the roads of our State; but that we have now reached a point where it is necessary to devise the ways and means for constructing them.

In the last supervisors' annual convention held at Albany the advisability of issuing bonds of the State to the amount of ten million dollars for the construction of highways was thoroughly discussed and it was unanimously voted that it would be advisable to bond the State for twenty million dollars. It was shown at this convention that ten million dollars would provide for substantially 1,250 miles of macadam highway; and on the basis of completing one-tenth of the roads in the State, namely, 7,500 miles distributed throughout the several counties, an expenditure would be required of sixty million dollars within the next six or eight years in the improvement of the highways of the State of New York. This expenditure would, in the opinion of many, be of greater benefit to all of the people, than an equal expenditure of money in any other direction that could be named.

* State Engineer and Surveyor, Albany, N. Y. This is a digest of a paper read by Mr. Bond before the ninth annual session of the American Society of Municipal Improvements, held at Rochester, N. Y., October 7-9, 1902.

EXCISE REVENUE FOR ROAD IMPROVEMENT

I am firmly convinced that we are on the eve of greater progress in the improvement of our roads than any other State has heretofore made. I predict that within the near future, the money required for the annual expenses of our State Government will be met by indirect taxation, leaving for the improvement of our public highways all of the income derived by the State from the excise money. This would give a fund of from four to five millions of dollars per year to expend in improving the highways of the State, without creating any debt and it has been suggested by wise statesmen that it would be well to amend the laws so that a given portion of this money can be expended within the limits of the incorporated cities and villages, as well as in the rural districts, thus providing for continuous pieces of improved road throughout all section of the State, the benefit of which can be enjoyed by the present generation. But until the Highway Law of our State is so amended we can, with safety, and propriety proceed under the Higbie-Armstrong Law, which has many features that especially recommend it to the public, as the first movement is made by the people in petitioning for the improvement of any particular highway desired, passing from them through their Board of Supervisors to the State and after careful investigation, surveys and estimates are made and the plans returned to the people through their Board of Supervisors for final action, all of which fosters the much desired principle of home rule and insures economy

and careful management throughout the whole process. This act has not only met with great approval in our own State, but has been so highly commended by the Office of Public Road Inquiries, of the Department of Agriculture at Washington that numerous requests have been received from other States in the Union which are now for the first time taking up the subject of highway improvement, asking for copies of the law and an explanation of its workings and in several cases I have been informed that it is proposed to adopt the general provisions of our law in many of these States.

One of the most encouraging features connected with the subject of highway improvement and one with which I have been deeply impressed is the fact that its importance seems to be so fully realized by all classes of our citizens. The cry for good roads comes not alone from residents of the rural districts (who would, at first thought, seem to be the persons most directly interested) but from all classes and conditions of men.

Several of the delegates to the Annual Supervisors' Conventions which have been held in Albany during the past three years are professional men residing in cities; the State Aid Act under which work is being conducted was introduced in the Legislature by a Senator from this city, and among the numerous callers at my office from all sections of the State are men residing in the larger cities as well as the villages and the country, and engaged in agricultural, commercial and professional work.

RESIDENTIAL SEPTIC TANKS

City Engineer Built Septic Sewage Disposal Tank Without Knowing It—Worked Satisfactorily—To Be Adopted for the Entire City—Brief Description of Plans Adopted

*By Burton J. Ashley**

In the year 1890 I moved into one of the suburbs of the city of Chicago, where there was neither water nor sewer service, but the dwelling had been provided with all the modern improvements so far as the plumbing was concerned.

Water service was provided for by means of pumping storm water from a cistern to a tank which was constructed in the attic, and sewer service was secured by the construction of a four-inch vitrified pipe main which emptied into the vault of an out-door privy which had been previously constructed as a primary expedient, and which, in turn, was provided with a common four-inch tile outlet, leading to a small slough about two hundred feet away. This privy vault was afterwards cut out of the course and the four-inch drain made to run continuously from near the house to the end of its outlet.

BUILT A SEPTIC TANK AND DIDN'T KNOW IT

Near the house, and through which this four-inch sewer passed, had been constructed a catch basin, four feet deep and three feet square with about two feet lying below a trapped outlet. The inlet was not trapped and, therefore, found ventilation through the soil pipe above the roof. The overflow of the storm water cistern above alluded to was also turned into this catch-all for the purpose of affording, as I thought, necessary flushing accommodations.

Nearly two years then elapsed before I attempted to clean out this catch basin, when I discovered, much to my surprise, that the receptacle needed no cleaning. Two more years rolled around and another attempt was made, but the result was the same as before. Later I learned that I had had in excellent operation, for more than six years, a septic tank. The wastes that had been entering this tank were of the ordinary kind produced by a household which, in this case, consisted of from three to five persons.

This crude appliance has now been in successful operation for twelve years, in which period it has not been cleaned out to exceed five times, and even then there has been an insignificant quantity of sludge to remove from the bottom.†

* City Engineer of Zion City, Illinois. This is a digest of a paper prepared by Mr. Ashley for the ninth annual session of the American Society of Municipal Improvements, held at Rochester, N. Y., October 7-9, 1902. In his absence the paper was not read, but was ordered printed in the proceedings.

† The attention of our readers is called to an article on page 248 describing a similar system for the purification and disposal of sewage. This will be of greater interest because of the interesting paper contributed by Mr. Ashley.—[Editor.]

Recently I had to design and assist in building a city to cover ten square miles of territory, two square miles of which at the present time has largely been built upon. One of the controlling factors of our design of the land was the matter of drainage and future sewer service. The future purification of the sewage, as it would be controlled by the topography of the area, as a matter of course, came in for a fair share of attention.

RESIDENTIAL SEPTIC TANKS TO BE USED THROUGHOUT CITY

The separate system of sewers was adopted as the one best adapted to the needs, especially as the residential septic tank could be readily utilized therewith. After due consideration I advised the construction of these small septic tanks, where drainage was available. These tanks, when permitted, were required to be constructed after the plans and under the supervision of the Chief Engineer.

The plan of tank adopted, is circular, three feet in diameter and, for the most part, three feet from the under side of the outlet to the bottom of the tank. Inlets and outlets to these tanks are placed on opposite sides to each other, made four inches in diameter, placed on the same elevation and enter the tank with a downturned elbow, that the flushing in of the wastes from the soil pipe, or laundry, or the discharge of the effluent may not disturb the scum which forms on top.

The bottom of the tank is made of concrete, the walls of brick, which are finished at the top of the ground the same as an ordinary sewer manhole. The interior below the discharge pipe is washed with four coats of pure cement wash.

The capacity of the tank varies according to the number of people in the house, but, for the most part, contains about one hundred and sixty gallons, which, compared to the service reputed to be rendered by the city's tank at Champaign, Illinois, would be sufficient to accommodate the wastes produced by from eight to twelve persons.

The first residential septic tank constructed in Zion City was made the size above described and served the household of twelve persons for a short time, when the construction of an office building required it to serve ten more persons additional, who only occupied this building during the day.

I feared this tank would be over-capacitated and therefore set a close watch on its action. At the end of about six weeks, after the tank had been put to use, a scum of about two inches in thickness had formed and septic action was going on in a satisfactory way. At

this writing (the latter part of September) the tank is still doing duty with a good healthy scum of about four inches in thickness and emits scarcely any odor. The sludge has not been examined and of it I cannot speak. Similar tanks in the city, under more favorable conditions, are operating satisfactorily. I have also designed and constructed two tanks of the oblong type for the use of a factory that will soon employ about a thousand hands.

SATISFACTORY RESULTS EXPECTED

Taking a position, which is largely based on my own experience, I have determined to require the universal construction of residential septic tanks, believing the effluent therefrom will be sufficiently liquefied and made incoherent by the bacterial action as to render the sewers into which it flows immune from greasy incrustations which are so much deplored by the sanitary engineer, as well as to decrease the demand for the installation of flushing tanks at the upper ends of small laterals.

I believe, in case there should ever arise a demand for further purification than that secured by the residential septic tanks, the cost of providing such a plant for the further treatment of the sewage of the city at one place in one volume would be greatly minimized.

RULES FOR REGULATING DISPOSITION OF HOUSE WASTES

For designing, locating and constructing these tanks during the early days of our city building, the following ordinances and rules have been adopted and are strictly adhered to:

"Sec. 16 (city ordinance). No septic tank shall be established except after plans approved by the City Engineer and countersigned by the Commissioner of Health.

"Whenever and wherever sewers or drains from residences or other private properties are built and constructed with a view to obtaining an outlet in any other storm water drain, subsoil drain or sewer, the same shall be so constructed that its uses may be limited to the following services:

"1st. No wastes from kitchen sinks, water closets, bath tubs, laundry tubs, lavatories, nor wash waters nor waste waters of any description shall be permitted to enter directly into such sewer or drain, without having first been discharged into a properly constructed septic tank located in a suitable position upon the premises.

"2nd. No storm waters of any description shall be permitted to enter directly or indirectly into such sewer, drain nor septic tank.

"3rd. Cellar drainage will be permitted to enter such private sewer or drain providing it has no connection in any way with the interior of said cellar, and must be so constructed that no scrub waters, slops nor residential nor private wastes can possibly enter the same, nor must this drain be connected with the septic tank, but must enter the private drain at a point beyond the connection of said sewer with the septic tank.

"4th. The planning and building of all septic tanks are now regulated by city ordinances and under the control of city authorities."

BIOLOGICAL SYSTEM OF SEWAGE DISPOSAL

What the System Is and What It Will Do—Easily Adapted to Any Conditions—Perfect Results Obtained

*By John N. McClintock, A. M., C. E.**

It is now more than two years since I called the attention of the members of this Society to the Glover System of sewage disposal. During the time that has intervened the art of sewage disposal by the combination of septic action and filtration has come to be recognized by the engineering profession and the public, generally, as of great value. In many respects it is the most wonderful and valuable discovery of modern times, because it solves the important municipal problems of sewage disposal and water purification.

WHAT THIS SYSTEM WILL DO

It cares for the wastes of a large city as well as a single homestead. It prevents the pollution of brooks, rivers, and lakes, whose water may be used for domestic purposes. It prevents the gradual filling up of harbors and channels with most obnoxious and offensive material. It permits the restoration of the game fish to the rivers of our country. While disposing of the offensive material of the sewage, it destroys all germs of contamination and disease so dangerous to the human race. It permits all this to be done in a scientific and inoffensive manner, and beneath the surface of the ground.

This means that a city or town, whether on the coast or in the interior, can care for its sewage within its own territory and not render the district of purification an unsanitary one; that its own air and water may be untainted; and that it may pass along these life-giving elements to its neighbors as pure as when received from the firmament above.

The surface of the area of the land devoted to the septic tanks can be covered by gravel or by loam and sod; and in like manner the primary and secondary beds; and devoted to almost any municipal purposes, such as city yards, recreation grounds, or park purposes. It may be laid out as a lawn with trees and shrubs, paths and drives, or otherwise elaborated.

As the effluent from the primary beds is colorless, odorless, and tasteless, it is possible to place the secondary beds when used as constant contact beds beneath the water of an artificial pond, constructed like the English filter-beds.

CAN BE BUILT UNDER A ROADWAY

In some cases it may be desirable to use the ground beneath a highway for the purification of sewage, without interfering with its

use as a thoroughfare. Thus in a street fifty feet wide, by using the whole width, the sewage of one thousand people can be cared for and purified in a total length of one hundred feet, or the sewage of two thousand people in a length of two hundred feet, the depth of an ordinary city block. I recall a city in Connecticut where such a treatment would be of the greatest advantage; for the sewage is carried to the river and discharged beneath a bridge. Above the bridge the water of the river is clear and attractive, uncontaminated by pollution of any character; below the bridge the water is foul and discolored and in every way offensive.

As it is possible to remove the pollution from the sewage and permit the water to flow away clear and inoffensive, so it is possible to clarify and purify the fresh water of rivers and lakes whether contaminated by animal or vegetable impurities and permit of their use for domestic purposes with perfect safety by using the combination of a septic tank and single or double filtration.

The surface of the purification works may be treated in the same manner as the sewage disposal plant, or the only covering may be over the last collecting reservoir. The water-shed may with this treatment be safely used for park purposes; and the effluent from the secondary filter may flow directly into the mains supplying the municipality, with absolute assurance that not only all germs but all forms of animal and vegetable life, even fishes and eels, will be kept out of the water supply.

HOW THE WORK IS DONE

The germs of putrefaction, disintegration, and all putrid diseases, come to the septic tank and meet ideal conditions for their development. In the long journey through the tank every particle of organic matter is subjected to their influence; and when the food for the bacteria is exhausted it is my theory that the bacteria feed upon each other, as in the course of Nature in the upper world; for it is a fact that a very few of the countless millions of putrifying bacteria escape from the tank to the filter-beds. The bacteria that do escape are mostly of the kind beneficial to the human race, the nitrifying bacteria, or those which convert the dissolved organic matter that escapes from the tank into plant food. These latter find a resting place on the surface of the filtering material, food to their liking, air and water, generate and multiply to the limit, and continue the beneficent work of purifying the natural element, water, so that it may be used again without detriment by the higher orders of animal

* Boston, Mass. This is a digest of a paper read by Mr. McClintock before the ninth annual session of the American Society of Municipal Improvements, held at Rochester, N. Y., October 7-9, 1902.

life. Some of the bacteria are washed through the primary bed and are received upon the surface of the secondary bed. If this is used as an intermittent filter, there is so much air in the beds that capillary attraction holds the thin films of water exposed to double its bulk of air and there is a combustion and oxydation of all organic matter and germ life. If the filter is one of the constant contact order, a different class of bacteria is generated therein with the same general result, the purification of the water and its separation from all extraneous matter.

Theories aside, it is a fact demonstrated by observation and ex-

periment that not only will the water flow from the Glover system purified, but that all harmless germs are retained in the apparatus. It is a principal, a natural law.

The model city of the twentieth century must be as clean as the camp of the ancient Israelite. It may have massive buildings, palatial homes, well kept streets, beautiful parks, schools, hospitals, and refined and educated inhabitants, and be as the whited sepulcher—a place to be avoided. To be a model city the well-being and health of every citizen must be guarded by strict attention to the sanitary law. There should be no unclean place in your camp.

SEWERAGE AND SANITATION

Many Timely Suggestions—Mechanical Devices for Abating Smoke Nuisance—Public Fountains, Baths and Convenience Stations

*By A. Prescott Folwell**

I PROPOSE to name some of the directions in which sanitation can effect municipal improvement, and discuss each in the most general way only. A list of such would include the collection of vital statistics, abatement and prevention of nuisances, including smoke, noise, odors, hideous and light-obstructing street signs and buildings; the providing of public fountains, baths, latrines and convenience stations; food inspection; prevention and treatment of communicable diseases; hospitals; abattoirs; and the disposal of the dead; as well as the drainage of wet lands, extermination of mosquitoes; consideration of effects of trenching and other earth excavation on the health of a community. Sanitation forms but a small part of the benefit afforded by many of these; but all of them, with many not mentioned, work in part to the sanitary betterment of cities.

VITAL STATISTICS

The collection of vital statistics is given more attention in Europe than in America, but our cities are moving rapidly into line. A brief consideration will show how important such statistics are.

Most of our large cities require every physician, midwife, undertaker, and clergyman to make returns to some public officer of all births, deaths and marriages at which they have served; and also that physicians report immediately all cases of communicable diseases. In many cases fear of isolation or quarantine prevents the reports of sickness. Rochester reports for 1901, thirty-one deaths from typhoid and only 102 cases, or a fatality of 30 per cent., while the average

for the past five years is 25 per cent. The average percentage of deaths from typhoid in other cities seldom exceeds 12 per cent., and the general average is 10 per cent. Rochester physicians therefore seem to be peculiarly unskillful in treating this disease, or delinquent in reporting cases. Now it is the sanitarian's part to prevent rather than cure disease; consequently the record of cases of sickness are more important to him than those of deaths, but are often incomplete for contagious diseases and altogether lacking for all others. Would it not furnish very important data to the sanitarian if every case of sickness were reported to him? A copy of the city map con-

structed for each disease, in which each case was indicated by a dot, would undoubtedly be of great assistance in detecting local causes.

ABATEMENT AND PREVENTION OF NUISANCES

Unsanitary conditions are created by the "smoke nuisance," by the odors from some chimneys by exposed excrement, by flooded urban land, by anything which totally excludes direct sunlight from a dwelling, and by nerve racking noises. Cities should encourage each other to suppress these nuisances by reporting successful methods and by rivalling each other in faithfulness in applying them. The smoke nuisance seems to be especially troublesome; while the public needs awakening to the importance of sunlight as a health-preserver, and of the effect of jarring noises in producing nervous disorders and through the nerves aggravating many others.

The extreme Eastern cities have been practically free from any smoky problem until within the last few months, but the scarcity of hard coal has led to the use of soft wherever possible, with the resulting dense smoke, and it is possible that some difficulty may be experienced in compelling urban coal consumers to return to anthracite when it be-

DESIGN FOR DRINKING
FOUNTAIN WITH
RUNNING WATER†

comes available; so that the nuisance may become more widespread than ever before and methods of combating it of more general interest. The more common method first tried by most cities is that of placing an ordinance upon the books, and it has been proven as commonly inefficient. It will not be enough to say, You must not make so much smoke, but an answer must be read for the retort, Are we then ready to shut down the factory? The more complete burning of gases, and the more uniform and higher heat resulting from continuous stoking by mechanical stokers and from better oxidation by mechanical draught, larger grates, and other simple devices, are well worth while from the owner's point of view. In this as in other reforms the public must be educated to expect bet-



DRINKING FOUNTAIN
WITH FAUCETS†



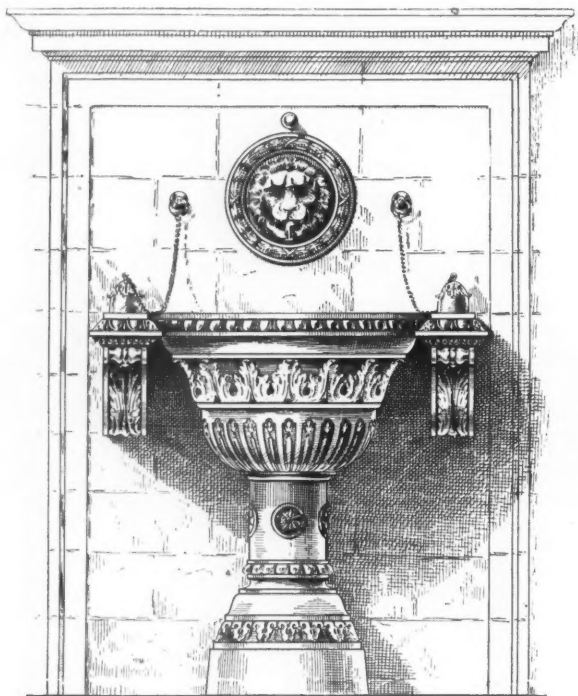
COMBINATION FOUNTAIN FOR
MAN, HORSE AND DOG†

* Consulting Engineer, Easton, Pa. This is a digest of a paper read by Mr. Folwell before the ninth annual session of the American Society of Municipal Improvements, held at Rochester, N. Y., October 7-9, 1902.

† These are copyrighted designs by The J. L. Mott Iron Works, of New York, by whose permission we are allowed to reproduce them to illustrate this article.

ter results, and then the owners must be made to feel the popular displeasure by detecting and publishing the names of offenders. This method, rather than spasmodic prosecution, has proven most successful.

One of the evils of a smoky atmosphere is the excluding of sunlight. Another cause of darkness, dampness and dirt is the height of modern buildings. In hundreds of buildings in many of our large cities are



AN ARTISTIC DESIGN FOR FOUNTAIN FOR EXTERIOR OR INTERIOR WALL†

office rooms, sales rooms, sleeping rooms, which have never received one ray of direct sunlight. Darkness, dampness and dirt are the ideal conditions for the preservation and dissemination of many, if not all, species of disease germs. Sunshine is the most effective germicide known. Not only germ diseases, but afflictions of the eyes and nerves with probably many others, can be traced to such conditions as their cause. The rule which has been adopted in London, is that no building shall be so high as to rise above a line drawn at an angle of 45° with the horizontal from the base of any building opposite either its front or rear; and I believe that the violation of this rule must in the near future cause weak eyes, pale cheeks, consumption and generally lowered vitality in large numbers of the clerks and business men of our largest cities.

PUBLIC FOUNTAINS, BATHS AND CONVENIENCE STATIONS

Public fountains and drinking places, the latter especially, are now considered a necessity in all large cities, and many small ones find them worth while. The cooling effect of a fountain in a small city park located in a congested district may mean increased health and even life to many a child and invalid, and render existence more tolerable to many a healthy adult; while the restful effect of splashing water is particularly soothing to nerves wearied of a city's jarring noises. Drinking fountains for horses, cattle and dogs are even more necessary in cities and towns of all sizes than for man. Information concerning the amount of water required to maintain these and possible methods of preventing waste; the best locations for them and the number required; the supplying of both ordinary and iced water to human beings, and the automatic cleaning of the cups used; these and other points will reward investigation.

Public baths are of late becoming a more common municipal institution. To mention a few examples only, Boston, Mass., Fonda, Yonkers and New York City in New York, Newark, N. J., Pittsburg, Pa., Chicago, Ill., and San Francisco, Cal., have public baths.

† These are copyrighted designs by The J. L. Mott Iron Works, New York, by whose permission we are allowed to reproduce them to illustrate this article.

In Boston's public schools, baths are provided and are compulsory where the necessity for them is evident. In 1900, thirty-six cities of the United States had either all the year or summer public baths. In these thirty-six cities are included all three of those having more than 1,000,000 population; two of the three cities having between 500,000 and 1,000,000; three cities having between 250,000 and 500,000 population, or 33 1/3 per cent.; six cities having between 30,000 and 50,000, or 10 1/2 per cent.; six having between 10,000 and 30,000, or 2 per cent.; and five places having less than 10,000 and more than 3,000, or 5 per cent. In New York State, by an act of 1895, all cities of 50,000 inhabitants, or over, must provide public baths.

In Buffalo, Rochester, and Philadelphia—probably in other cities also—are public wash-houses for the convenience of the poor whose contracted living quarters do not admit of washing in their so-called homes. Both of these institutions encourage and assist in cultivating that personal cleanliness which must go hand in hand with perfect municipal cleanliness. A collection of information concerning the location, structural and mechanical details and administration and popularity of these would be helpful to the many cities which are contemplating the introduction or extension of these efficient aids to sanitation.

In our large cities latrines or convenience stations are a necessity which is but poorly met. Most large parks contain such stations; but in the business districts where thousands congregate daily the saloon or hotel for men and the larger dry-goods stores for women are looked to to furnish as a convenience, which the sensitive person feels should be paid for by a perhaps unwished for beer, cigar or ribbon, what the city should provide for all as their right. European cities are far ahead of us in this respect, although we would not be



A SANITARY DRINKING FOUNTAIN†

satisfied with the regard paid by them to more or less conventional modesty. New York has made a beginning of supplying such stations underground in the business districts. The home water closet in the cellar, basement, or under the back stairs has been pretty well abolished; and while an underground municipal closet is better than none, it would seem that the same arguments which were advanced against the private dark-closet would hold against the public one.

SOME METHODS IN SEWER MAINTENANCE

Eternal Vigilance Necessary—How to Clean the Sewer—Care of the Catch Basins—The Connection of House Laterals

*By John H. Emigh**

THE object to be sought in the maintenance of sewers is to provide, at all times, for an unobstructed flow of the sewage, to prevent solid mater from lodging along the main line or its laterals, and to secure good ventilation. Neglect of the first is likely to result in a set-back into house fixtures and an overflow at their lowest outlet. Neglect of the second leads to decomposition and the attendant offensive or dangerous gases; and of the third to an increased pressure of those gases until they are forced through the house traps and into residences. Only about one ounce pressure per square inch is sufficient to force the seal of an ordinary house trap; and I suppose that in every city there are many residences whose plumbing is of the older methods and is practically without ventilation. This means that when sewer gas has once entered the house it has no means of escape other than through fixtures into the rooms.

The first requisite for successful maintenance is good construction. This consists in having proper foundations, thorough tamping about the body of the pipe in back-filling, imperviousness of joints, uniformity of grade and good alignment between manholes or lantern-holes, easy curves and smooth flow surfaces at the man-holes, frequent Y branches for connecting house laterals, all with a plan and profile containing a clear and reliable record of location, depth, grade, position of Y's and other sewer adjuncts and sometimes the proximity of water or gas pipes.

ETERNAL VIGILANCE NECESSARY

The second requisite for good maintenance is systematic vigilance. It is injudicious, expensive and the cause of much annoyance or damage to neglect the sewer until it has become stopped. The only way to avoid such a condition is to take proper precautionary measures, which should include regular examinations at not too great intervals. There is probably no more efficient and economical method of keeping the sewer clean than frequent flushing. Among the so-called invented devices probably none has reached a greater popularity than the automatic flushtank. If used it must be frequently inspected to see that it is properly doing its work. It is probable that regular and thorough flushing once in each three or four weeks is as often as it is necessary except in special cases. A 3-inch or a 3½-inch pipe direct from the street water main to a man-hole will, under ordinary pressures, deliver an abundance of water and if these connections be made once in about 1,000 feet the man in charge can, without great trouble, thoroughly flush any or all parts of the sewer at the time he is making his examinations. A stronger flush may be obtained by plugging the outlet, nearly filling the man-hole with water, then withdrawing the plug. If this is done at any other place than at the head of the sewer care must be taken that the water does not overflow into low fixtures of the neighborhood.

Man-hole covers should be placed flush with the surface of the street both for convenience and as a means of ventilation.

Laterals entering from factories and similar buildings should be provided with some arrangement for keeping from the sewer any thing that is likely to form in it an obstruction. A piece of cloth, 20 yards in length, late from the loom; or a piece of 4-inch belting 10 feet long found within the sewer are indications that some people are indiscreet. I know of no better provision for such places than a man-hole near the outside of the building, its bottom made slightly below the outlet, enough so that the discharge is made first into a quarter-turn, opening downward. This works very well, it keeps the outlet opening always submerged and acts as a trap. It is objectionable in that matter accumulates in the man-hole and may need occasional cleaning out, but it is probably less objectionable than the usual form of connection.

THE CLEANING OF THE SEWER

In a combined system or in the surface water sewer of a separate

system there is frequently an accumulation of gravel or street dirt that greatly reduces the capacity of the sewer or stops it entirely. Too often this condition is not known until there is a heavy shower and the sewer refuses to do its work. There is great liability to trouble of this sort wherever the higher parts of the system are in dirt roads and along steep hills. The strong wash along street surfaces carries gravel and sometimes stone beyond the catch-basin trap into the sewer, thence to the flat grades where the reduced velocity allows them to stop and accumulate. These places of accumulation should be watched and frequently attended to. If taken in time the obstructions may generally be removed by a strong stream of water obtained by a direct connection with the street main as already described or through a line of hose attached to the nearest hydrant. Sometimes a heavy chain with knots in it may be drawn either way in the sewer thus loosening the material that has been deposited. Much of this may be taken from the next man-hole below if a shoveler is kept constantly at work and the water is made to flow over a blocking which covers the lower half of the outlet of that man-hole. When the sewer is large enough so that men may conveniently work inside it becomes simply a case of shoveling the material and conveying it out by an arrangement that best suits the conditions.

When the sewer is entirely stopped the problem is one of greater difficulty. No rule can be set down for its treatment and the solution must be as the case requires even to the taking up of a portion of the street, if necessary. Ordinarily the obstruction must be worked at from the man-hole next below. Sometimes a sewer may be probed for 200 or 300 feet by a rod made of sections, either in wood or iron, each 3 or 4 feet in length, joined at their ends by "Felton's Improved Coupling." These constitute a convenient arrangement and may accomplish the purpose in small sewers of from 8 to 12 inches in diameter. Sections made of wood are light and easily carried about. A stronger rod and one capable of greater length may be made of ½-in. or ⅝-in. iron pipe, cut in sections of the same length as above described and fastened together by screw couplings. This with hook or claw at the end is likely to accomplish much better work than the other. It is slower to make up and much heavier to handle than the one made of wooden sections.†

A water-jet may, at times, be very useful. Perhaps a mirror may be made to throw sunlight into the sewer and help to determine the location and character of the obstruction.

Whatever the difficulty I believe it is well to keep a tabulated record of the date, character, location, cost of removal and such other explanations as may seem wise, as well as a record of the flushings. They are convenient for reference, they explain accounts, and are likely to be of use to the successor in office.

CLEANING CATCH BASINS

Cleaning catch-basins is an important item of maintenance and one of the most expensive unless well managed. Hardly another bit of work has so strong a tendency to slowness on the part of the workman. As suggestive of a good method now being used, I take the liberty to quote from a letter recently received on this subject as follows. "All catch-basins are numbered and are regularly inspected by a man who records the depth of dirt in each. From this record lists of the basins needing cleaning are made out and given to the cleaners, with the route they are expected to follow. The cleaners make a return each day of the basins cleaned and of the number of loads taken from each. From these returns we obtain a

* City Engineer of North Adams, Mass. This is a digest of a paper read by Mr. Emigh before the ninth annual session of the American Society of Municipal Improvements, held at Rochester, N. Y., October 7-9, 1902.

† A patent sewer cleaner has recently been put upon the market by Michael T. Connolly, the inventor, 238 17th street, Jersey City, N. J. This device is recommended by Inspector of Sewers Klein, of New York City. City Surveyor Smith, of Bayonne, N. J., said in a recent letter: "The Connolly patent cleaning device has been used in this city during the present year. Some 23,500 linear feet of sewers have been cleaned with it. The work was efficiently and quickly performed, and at a cost much less than by any other method known to me."—[EDITOR.]

check upon the work each cleaner is doing and are able to obtain the cost per cubic yard of the material removed from the basins. When the cost per cubic yard runs above normal figures we detect it and at once investigate the cause. By the adoption of this method we have succeeded in greatly reducing the cost of cleaning (I believe it to be capable of still further reduction), and obtain a record of each basin which is valuable in case of complaints. By this method the men do not stop to clean a basin that has three feet of water and only one foot of dirt but attend to only those basins which need attention. They do not have to be accompanied by a foreman, as the returns show the amount of work done each day."

The same writer says that the cost per cubic yard for removing and hauling away was \$0.665 in 1899, and \$0.68 in 1900. The haul was probably about 2,000 feet and the difference in cost probably due to the difference in length of haul.

CONNECTION OF HOUSE LATERALS

The manner of connecting house laterals with pipe sewers is a matter that belongs frequently to maintenance and is of considerable importance, especially if no Y has been provided, in construction, for the connection. Cutting an opening through the side of the sewer should not be allowed. Removing a length of pipe and replacing it by another that contains a Y branch is objectionable because with any considerable run in the sewer or with the run turned on before the cement has had time to set is very likely to result in leaky joints.

Taking up three or four lengths of the old pipe in order to not be obliged to cut away any of the bells in relaying is open to the same objection. The writer believes there is no better method than to excavate entirely around the pipe and encase it in brick masonry or concrete nearly to its top, then carefully cut the hole in the top of the sewer and join the lateral to this by a quarter or an eighth bend, making sure that none of the smaller pipe extends inside the shell of the larger pipe; then continue the masonry to cover the joint thus made. This, if properly done, does not weaken the sewer, nor cause it to leak or become rough on the inside. It may reduce somewhat the grade of the lateral but this it should be able to stand or the elevation of the fixture is dangerously close to that of the sewer.

The question of maintaining ventilation is a somewhat difficult one, especially in dirt roads. In paved streets a perforated manhole cover seems reasonably satisfactory if the perforations are kept open, but in the dirt road they are very liable to become stopped; yet there seems to be no better method even here. To obtain good results they must be watched and frequently cleaned. A 4-inch pipe connected with the drain just outside the running trap of each house and running to a point above the roof no doubt provided a first class ventilation for the sewer and protects the house from sewer gas as much as is possible. Its expense makes it somewhat objectionable and if carried up in a conspicuous place it is unsightly. The necessity of good ventilation has already been mentioned.

WOOD PAVEMENTS UNDER HEAVY TRAFFIC

Slight Wear as Shown in Boston—Will Not Absorb Moisture—As Durable as Granite—American Better than Foreign Wood Pavement

*By Frederic Arnold Kummer **

SINCE speaking to you on the subject of wood pavements at the annual convention of this society at Niagara Falls last year, it gives me pleasure to say, that the opinion of engineers and of the public generally has not changed in any respect regarding pavements of this class, but on the contrary the conviction has become stronger in the minds of everyone that properly constructed wood pavements have many distinct advantages over any other form of roadway. Indeed it is hardly exceeding the truth to say that wood is now recognized as a standard paving material everywhere and is being specified in many places for street and other work, especially under heavy traffic.

THE TREMONT STREET PAVEMENT

I call your attention to a paving block, which was removed from Tremont street, Boston, some months ago, after being in the street about two years. It was taken from near the center of the street, where the traffic is very heavy, as indeed the traffic is all over this important thoroughfare. The surface of this block is almost as hard as stone and the reduction of the depth which is shown is very slight, being at the most not over $\frac{1}{8}$ inch in two years, or $\frac{1}{16}$ inch per year, which would give practically an indefinite life to the block. It is further of interest to note that this reduction in depth is not due to wear, but to the compression of the upper fibers of the block under heavy travel, so that it is quite certain no corresponding reduction in depth will be apparent during succeeding years. If you will observe the surface of this block, you will see that under the action of the traffic, the sand which was spread over the surface of the street, has been driven into the outer fibers of the wood, so that the whole wearing surface is compacted into a tough and absolutely impervious surface, which offers perfect resistance to the action of horses' shoes or the abrasion of rolling traffic. It is also of great interest to note that the edges of the block have not rounded off any, due to the fact that the blocks were laid as closely together as they can be driven, thereby leaving no point of attack, as is the case with granite blocks or other block pavement laid with wide joints.

WHAT SHOULD GOVERN IN THE SELECTION OF A PAVEMENT

In considering the general question of the paving of streets, several

forms of pavement seem open to selection, namely, granite block, wood, asphalt, vitrified brick, asphalt block, bituminous macadam and ordinary macadam. Of these pavements, in my opinion, only the first three named have any place under heavy traffic and it is questionable whether asphalt, unless laid with much greater care than is usually the case, should be included. When I speak of heavy traffic I mean heavily traveled streets in the densely populated parts of our larger cities. I do not thereby waive any of the advantages of wood as a pavement for residence streets, where a quiet, noiseless pavement is desirable, but I do make the claim that for streets of the very heaviest travel, such travel even as is found on streets in London, such as the Strand, Fleet street, and others too numerous to mention, wood is the most satisfactory and economical pavement that it is possible to lay. Experience has shown abroad that this is true, and streets such as those named above have travel which is far heavier than is to be found upon any streets in this country, although it is probable that on some of our streets the concentration of the load is greater owing to the presence of street car tracks in the roadway. If we exclude asphalt as a suitable pavement for streets of this class, and it is my belief that the experience now being had with asphalt on Broadway in New York demonstrates that the pavement cannot carry such traffic without continual repairs, we have left only granite block and wood from which to choose. I think that had I made the statement to you gentlemen five years ago that I believed that wood, properly selected, prepared and properly laid, is a more durable pavement than granite block, you would have laughed at me, but the experience that we are having with pavements of this character leads us to that conviction in spite of its apparent improbability. I will, however, qualify the statement by saying that it is our belief that wood pavement has a longer serviceable wear under heavy travel than granite block. I do not mean that it will out-last granite block, but I mean that at the end of a given period, say ten years, its condition for travel will be better than the condition of granite block.

TREATED WOOD WILL NOT ABSORB MOISTURE

Granted that it is possible to so prepare wood that it does not absorb moisture and is proof against decay, let us consider how much a block of wood can be destroyed by the action of traffic. If the practice were followed of laying the blocks with one-quarter or one-

* Digest of a paper read by Mr. Frederic Arnold Kummer, 29 Broadway, New York, before the ninth annual session of the American Society of Municipal Improvements, held at Rochester, N. Y., October 7 to 9, 1902.

half inch joints, as is the case abroad, the exposed edges of the blocks would undoubtedly wear with more or less rapidity under the action of the shoes of horses. This wear is not as great in the case of wood as one might at first suppose, as has been demonstrated by the Boylston street pavement in Boston, to which reference has already been made; but by laying the blocks on streets which are level or nearly level with no joints between them whatever. In other words, by driving them so closely together that their surface under travel presently becomes unified, presenting no joints or cracks, a smooth surface results which has no vulnerable point at which it can be attacked by the action of traffic. The calks of horses' shoes cannot chip off the surface of the pavement, as is the case with brick or even stone, nor can the fibers of the wood be ripped off because they are vertical, and resemble in this respect a bundle of fine wires set on end and tightly wedged together. We have found that the action of traffic on such a block is to drive the upper ends of the fibers down and compress them, so that the heavier the traffic, the more solid becomes the surface of the block, just as would result from the continual pounding with a hammer upon the end of a stick of timber. This felting action, as it perhaps might be termed, upon the fibers of the upper surface of the block, is assisted by the resinous material forced into the wood along with the creosote oil, for which reason we have never found a case of brooming in the upper surface of a block as it is found with the timber as treated abroad, and especially when laid with an open joint. The whole theory of the vertical fibers in the block is that they should be tightly bound together, so that each one supports its neighbor, and for this reason the faces of the block should not be separated by a joint if it can be avoided, as otherwise the blocks cannot mutually support each other.

In the case of the grooved block used on Boylston street, the groove between the blocks was one inch deep and the same results would have been secured had the groove been only one-half inch deep. This small groove would leave almost the entire two faces of the block bearing against each other and supporting each other solidly in the street.

BLOCKS MADE FROM SELECTED MATERIAL

Owing to the fact that the wood selected for treatment is all heart wood, there is very little, if any, difference in density in the individual block. What difference does exist is largely made up by the greater absorption of the preservative fluid by the more porous blocks and the corresponding less absorption by the denser blocks. This may perhaps seem to you rather a finely drawn theory, but yet the fact remains that over two years of heavy traffic on Tremont street have failed to demonstrate the slightest irregularity in the wear of individual blocks. I mention this fact because this is the only way in which such a pavement could wear out; that is, by wearing in spots which would result in holes in the pavement. So long as the wear is even over the entire surface of the pavement, its life is almost indefinite.

In the foreign pavements far less care is taken in the selection of the wood and a large majority of the blocks laid have a considerable proportion of sap wood in them, this wood being extremely porous and much softer than the harder blocks, does produce a certain irregularity of wear in the pavement. It is for this reason that the company with which I am connected has thought it necessary to use extreme care in excluding all but the best heart timber in construct-

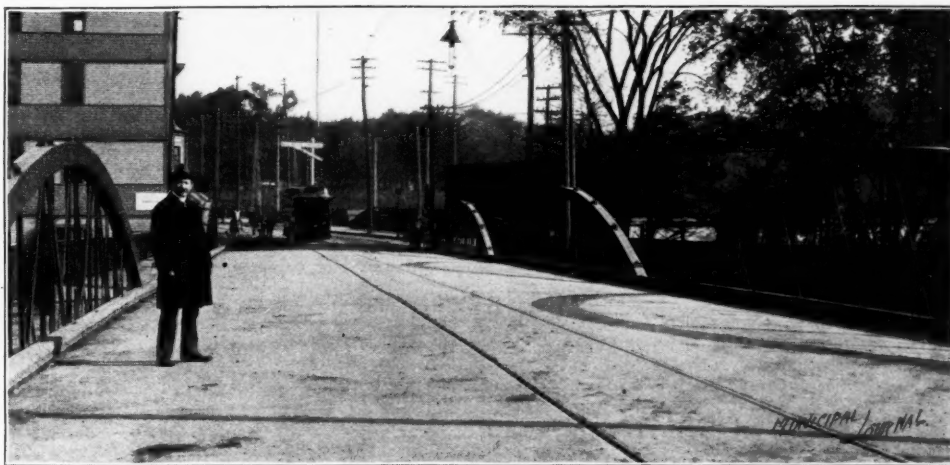
ing its pavements. The four vital points of difference between the London pavements and those laid in Boston are: First, the far greater hardness of Georgia pine as compared with Swedish deal. Second, the treatment of the timber with 22 lbs. of a mixture of creosote and resin as against 10 lbs. of straight creosote oil generally used abroad. Third, the selection of all heart wood and the exclusion of all sap wood, a practice not followed abroad. Fourth, the laying of the blocks with a tight joint.

BETTER THAN FOREIGN WOOD PAVEMENT

In these four respects we believe we have vastly improved upon the foreign practice, yet consider that under a traffic of over 40,000 teams per day, the life of wood pavements on the Strand in London is given in official reports as seven years. Very few, if any, granite pavements would be in condition for travel at the end of that time under that traffic. It is therefore first the splendid showing of the pavements as laid abroad, and second, the improvements which we now have made over the foreign practice, which causes us to say that properly constructed wood pavements have a longer serviceable life than granite.

In trying to point out reasons why in our opinion, properly constructed wood pavements are the best pavements for very heavily traveled streets, we have confined ourselves merely to the question of durability. We believe this to be true, even had wood pavements

no other advantages than that of extreme durability, but when we can add to this the noiselessness of such pavements and their high sanitary qualities, and to this add the ease with which they are cleaned and repaired and the smoothness, which is so noticeable a feature of wood pavements, and so great a disadvantage with granite pavements, there seems to be every reason for



CREO-RESINATE WOOD PAVEMENT LAID ON MOODY STREET BRIDGE, WALTHAM, MASS.

using wood in preference to granite. On top of all these advantages we can place that of price, since a thoroughly well constructed wood pavement on concrete may be laid for a lower price than a first class granite block pavement.

Many persons might be ready to argue that the smoothness and noiselessness of the wood would be sufficient to recommend it even if it were not so durable as granite, but we are now prepared to say that we can lay a pavement which possesses all these advantages and which is quite the equal of granite block in durability, at a lower price than granite block, and if this is the case and the company laying these pavements has guaranteed the results on its pavements in Boston with a ten year bond, why should not the pavement at once recommend itself for streets of heavy travel in municipalities? I will say that the pavement is rapidly commending itself to municipal authorities for this very work, and in substantiating this claim I may say that ordinances for over \$100,000 worth of wood pavements are now under consideration by the City Council of Baltimore, Md., for paving some of the heaviest traveled streets in the city; and the pavement has been recommended for the roadway of the new East River Bridge between New York and Brooklyn, and the Blackwell's Island Bridge, between the same points; that it is about to be laid on Montague street in Brooklyn to replace granite blocks on concrete between the tracks of the Brooklyn Rapid Transit Company, and that it was recently selected and is being laid by the Brown & Sharpe Mfg. Co., of Providence, as the best paving material to be laid in and around its new foundry, in a location where constant and heavy trucking makes an extremely durable pavement a necessity.

THE BITUMINOUS MACADAM PAVEMENT

What Has Been Accomplished in Two Years—More than Six Hundred Thousand Square Yards Laid or Contracted for This Year—Larger Equipment Needed for Next Year

*By Fred J. Warren**

THE name, bituminous macadam, was selected by the promoters of the pavement as descriptive of its construction, combining, as it does, the best features of the asphalt or bituminous pavement and macadam. In some respects, however, the selection of the name is an unfortunate one, as it has given the impression, in some cases, that it is a cheap pavement, and, in others, that it is like macadam, which in some localities is very unpopular. Extreme cheapness is not claimed to be one of the advantages of the pavement and it is

practiced in the bituminous macadam pavement, so that the pavement will have several times more life than when constructed on the asphalt theory, and I feel much more certain that over 95% of the causes of initial failure can be overcome by the adoption of the bituminous macadam principle."

ORIGIN OF THE IDEA

Something over two years ago, after an experience covering a period of twenty years, in the refining of asphalt, manufacture of bituminous cement and the laying of asphalt pavements, the idea occurred to one of the Warren Brothers that by combining the essential principles of the most improved asphalt or bituminous and the most improved macadam pavements, a result could be reached which would: (a) Give a pavement with greater durability than asphalt; (b) Provide a foothold for horses equal to macadam and, at the same time, maintain the relative or general smoothness of an asphalt surface; (c) Overcome the necessary muddy or dusty condition of macadam, and provide a pavement that, while having the density of solid stone, at the same time have great elasticity.

The theories on which the construction is based are: First, that, with a solid, well rolled sub-foundation, a thoroughly rolled base of crushed stone, such as is used in the most improved macadam pavement, and paved with bituminous cement is practically as good as any foundation. No one ever heard of a well laid macadam pavement failing because of the foundation.

Second, that with a rough crushed stone base, coated with hot bituminous cement and a scientifically prepared wearing surface of bituminous concrete made of crushed stone and bituminous cement, the shifting or rolling of the ordinary asphalt pavement can be overcome. The shifting is due to two principal causes: (a) Rolling on the smooth concrete base, and, (b) Rolling on each other of the particles of fine sand used in the wearing surface of the ordinary asphalt pavements during hot weather when the bitumen or asphalt is in a semi-plastic and fluid condition. This tendency to shift limits the amount of bitumen which can be successfully used in an asphalt pavement to 10% or less.

Third, that by using for the mineral aggregate of the wearing surface angular particles of the hardest available crushed stone varying in size from about 3 inches to an impalpable powder, in such proportion that the succeeding sizes will fill the coarser voids in the larger sizes, a far greater density could be secured than had previously been attained in either macadam or asphalt pavement construction. To secure the best results it is essential that the crushed stone, after heating, be separated into several sizes and then mixed by machinery in definite proportion by weight.



BITUMINOUS MACADAM PAVEMENT, ROME, N. Y., LAID IN 1902—THE FOUNDATION

being presented to the public on its merits of superiority and not as a cheap pavement. In appearance it is not, on casual observation, materially different from asphalt, but on close examination the particles of stone which afford the more secure foothold, can be seen on the surface but held firmly in place by the bituminous cement.

THE PRINCIPLES INVOLVED

As I explained in a paper read before the Boston Society of Civil Engineers early this year, "the principle on which the bituminous macadam pavement wearing surface is combined, is the reverse of the principles on which the ordinary asphalt pavement is built. In the present asphalt or tar pavement the bituminous cement is used to support fine mineral grain, such as sand, which, in themselves, have no firmness to sustain traffic, in such a way that the fine mineral grains will be held or supported by the bituminous cement, so that the mortar or mastic, will, at all atmospheric temperatures, sustain the weight of traffic, and, at the same time, resist abrasion.

"The bituminous macadam is built on the principle that, independent of the bituminous cement, relatively coarse and fine mineral grains should be combined in such a way as to have a firmness in themselves, to sustain the weight of traffic. The bituminous cement is supported, or held in place, by the proper arrangement, as to size, of stone particles. The bituminous cement is used solely for the purpose of preventing attack on the stone from water and weather, and to bind the particles together sufficiently to prevent abrasion from traffic at all atmospheric temperatures and, at the same time, provide an elastic bituminous cement or cushion between the mineral particles which will deaden the jar and prevent the wearing effect caused by friction from the movement of its integral parts.

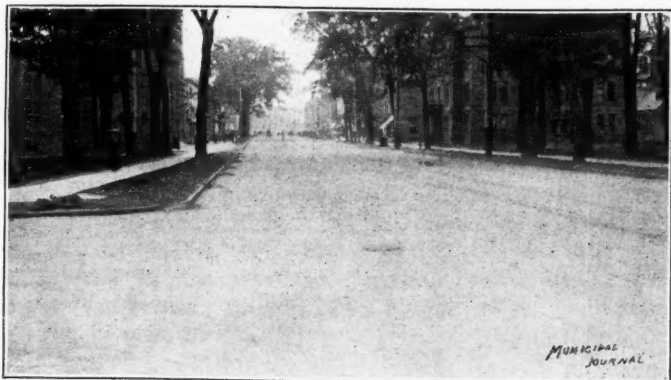
"The life or efficiency of either pavement depends largely upon the skill and care with which the various elements of the wearing surface are selected and combined, but I believe it is possible to select and combine the elements on the principles of this theory, or, as

* This is a digest of a paper prepared by Mr. Fred J. Warren, of Boston, and, in his absence, read by Mr. George C. Warren, of Utica, N. Y., before the ninth annual session of the American Society of Municipal Improvements, held at Rochester, N. Y., October 7 to 9, 1902.



BITUMINOUS MACADAM PAVEMENT, ROME, N. Y., LAID IN 1902—POURING ON THE BITUMINOUS CEMENT

Fourth, that, by increasing the density and thus decreasing the voids and, by having the bulk of the mineral aggregate composed of coarse angular particles of stone, the voids can be thoroughly filled with bituminous cement and, by using a bituminous cement which is unaffected by water, a thoroughly waterproof wearing surface of bituminous concrete can be produced.



THE FINISHED BITUMINOUS MACADAM PAVEMENT—ROME, N. Y.

Fifth, that particles of carefully selected, crushed, hard stone, held firmly in place by an elastic bituminous waterproof cement, would provide, for the wearing surface of a pavement, one of the most durable substances known and a sufficiently rough surface to give an ideal foothold for horses.

REDUCES THE VOIDS TO A MINIMUM

In inverse ratio, the percentage of voids in the mixture of different sizes of stone used, indicates its density, or specific gravity. Uniform sized particles of any shape, or size, contain approximately 40 per cent. of voids, and ordinary sand contains 30 to 38 per cent. voids,—very seldom as low as 30 per cent. The most carefully prepared mixture of several grades of sand used in the most modern asphalt pavement mixture contains 25 per cent. of voids.

The use of graded stone reduces the voids in the mineral mixture and the rigidity of the stone permits of the use of a softer and therefore, more durable bituminous cement than can be used with sand.

By minimizing the exposure of the bitumen and the use of a softer bituminous cement,—which would require more exposure to render it inefficient,—it is believed the cement itself will retain its binding or cementing properties longer than would be possible in sand mixtures.

By using crushed stone varying in size, from a maximum of two inches to an impalpable powder, in exact proportions, as above described, we are able to reduce the voids to 10 per cent. and by using enough of the bitumen to thoroughly coat *all* the particles and fill *all* the voids, we get a *thoroughly* waterproof wearing surface. We do not mean by this that it is *advisable to excessively wet the pavement*. Any paving material will wear longer if dry than wet. Continual moisture and mud on a pavement, combined with the abrasion of steel wagon tires, produces the condition which is employed to saw stone and other hard substances. The bituminous macadam does not entirely overcome this, but by filling the voids with an elastic bituminous cement, which is absolutely unaffected by water, it does reduce the effect to a minimum. Like other forms of pavement, bituminous macadam is in better condition for horse and foot traffic when dry and clean than when wet

and dirty. It should, therefore, be frequently cleaned the same as other forms of pavement.

The bituminous macadam surface is so dense and the particles of stone so firmly held in place by the bituminous cement that, even when made of the hardest trap rock, a section of the pavement when chilled and broken will fracture through the stone. In other words the stone will break before it will cleave from the cement.

LARGE EXPENDITURE OF CAPITAL AND ENERGY

These are the basic principles of the development of the bituminous macadam pavement. To accomplish what has been done has required a vast amount of energy and hard work and scientific study on the part of men having large practical experience in other forms of bituminous construction and has consumed a considerable amount of capital to reach the present stage of development.

With the assistance of an able chemist, of large experience in the study and practical use of bituminous construction and, by devising considerable entirely new apparatus, the first nine months of the development of the theory were devoted to diligent laboratory work to determine the best ingredients and the best combination of them to carry out the theory of the proposed construction.

This brought us to the spring of 1901, when the prospect of success seemed sufficiently sure to warrant the seven Warren Brothers,—all of whom had devoted their business lives and training to the several branches of the bituminous and asphalt paving business,—in dropping their other interests and assisting in the development.

During the first year we succeeded in getting small contracts aggregating something less than 25,000 square yards in seven cities of the United States, five of which are within fifty miles of Boston. Laid with inadequate equipment and crude ideas of detail some of this work, while generally satisfactory, does not fairly represent the possibilities of construction.

The attention attracted by the samples laid in 1901 was far beyond the expectations of anyone and early this year it was realized that much trouble would be encountered in executing work contemplated, and orders were placed in January for seventeen plants of an entirely



PLANT FOR LAYING BITUMINOUS MACADAM PAVEMENT

improved pattern. The plants were all of a modern type, with rotary drums, elevators, elevated screens and bins which would separate the stone into six different sizes fitted with scales, which would weigh each separate size of stone. The work of getting the plants out of the shop as fast as desired was an impossible undertaking and the wet weather of early spring and summer made it

impossible to have work well under way until after August 1st.

THE PAVEMENT LAID IN MANY CITIES

It became evident early in the present year that, to cope with the demand, a large increase in capital, equipment and practical working force was essential. The results may be briefly summarized as follows:

1. Work constructed and contracted for during the present year aggregates 630,900 square yards, in the following thirty-nine cities: Allentown, Pa.; Brookline, Mass.; Cleveland, Ohio; Duluth, Minn.; Holyoke, Mass.; Lynn, Mass.; Manistee, Mich.; Mt. Clemens, Mich.; Nashville, Tenn.; Portland, Me.; Rome, N. Y.; Boston, Mass.; Bay City, Mich.; Cambridge, Mass.; Everett, Mass.; Harrisburg, Pa.; London, Ont.; Mauch Chunk, Pa.; Norristown, Pa.; Nantucket, Mass.; Newport, Ky.; Pawtucket, R. I.; Brooklyn, Ohio; Brockton, Mass.; Conshohocken, Pa.; Huntington, Ind.; Ironton, Ohio; Lowell, Mass.; Montpelier, Ind.; Newport News, Va.; Norwich, N. Y.; Port Huron, Mich.; Taunton, Mass.; Tacoma, Wash.; Watertown, N. Y.; Saginaw, Mich.; Worcester, Mass.; Waltham, Mass.; Yonkers, N. Y.

This is equal to over 35 miles of street, 30 feet wide. There has probably never been a time in the history of cities when a new form of pavement has appealed to the engineers and other officials, to the same extent, and I doubt if any paving company has ever been called upon to organize so large a force in a new line in an equal length of time.

2. Capital employed in the business, upwards of \$750,000.
3. Twenty complete new portable heating and mixing plants, each having as great a capacity as the most modern railway asphalt plant, and with some important improvements thereon.
4. The organization of five well equipped new companies besides the Warren Brothers Co., devoted exclusively to the introduction of this pavement.
5. The regular employment in charge of different departments of the business of ninety-one men who have had from five to twenty-five years' experience in the asphalt paving business.
6. At the present time, active construction of this pavement is being carried on in eighteen cities of the United States and Canada.

LARGER EQUIPMENT NEEDED FOR NEXT YEAR

Our resources are taxed in every department for this year and for more than two months we have given up all serious effort toward securing additional contracts. It is now evident, that to care for the business in sight for next year a further large increase in capital, equipment and practical working force will have to be made during the coming winter.

In one respect the development has been a disappointment to its promoters and that is in the matter of cost of construction which proves to be as great as, and in some localities greater than, that of asphalt.

The bituminous cement and stone in the bituminous macadam base cost practically the same as the hydraulic cement and stone in the hydraulic concrete foundation of the asphalt pavement so that the only saving in cost of foundation is the sand and part of the labor employed in mixing concrete. The crushed stone used in the wearing surface generally costs twice, and sometimes three times, as much as the sand used in asphalt pavement construction.

The bituminous and stone mixture used in the wearing surface of the bituminous macadam is so much more dense and tough than the sand mixture of the asphalt pavement that the time, labor and power required to properly mix the ingredients and handle the mixture on the street is, with bituminous macadam, fully double that of asphalt. This is a condition which we did not foresee.

Like all forms of construction, the cost varies very much, depending upon the local cost of labor and materials, size of contract and other local conditions.

One important thing which has been developed to a certainty is that bituminous macadam can be laid, with special design to provide a rough surface so as to afford a good foothold for horses on very steep grades. In the city of Pawtucket, R. I., the pavement has been in successful use since May, 1901, on a street with a grade of 12 per cent., and has received the unanimous indorsement of hundreds of engineers and practical road builders who have critically examined it.

The Massachusetts Highway Association devoted its quarterly meeting held in May last to the examination and consideration of this pavement. I take the liberty of quoting from the remarks of Hon. W. E. McClintock, chairman of the Massachusetts Highway Commission, made at that meeting, as follows:

"It has unquestionably solved the problem of pavement for steep grades, and, if its cost were doubled what is asked for it, it would be the most economical pavement for such conditions."

Recently a joint committee was appointed by eight organizations, including the Automobile Club of America, The New York Truck Owners' Association, The Road Drivers' Association of New York, The Associated Cycling Clubs of New York, The National Association of Automobile Manufacturers, The Associated Cycling Clubs of Long Island, The League of American Wheelmen, and the Staten Island Driving Club, for the purpose of investigating this bituminous macadam pavement. The members of the committee, after a personal inspection of the various pavements already in use, reported in favor of bituminous macadam for the following reasons: (1) Its freedom from mud and dust; (2) Absence of slippery surface; (3) No evidence of cracking; (4) Its durability; (5) Its resiliency; (6) Its freedom from traction; (7) Its sanitary advantages; (8) Good appearance of the finished pavement; (9) No cross walks needed at street intersections; (10) Simplicity of construction; (11) Ease of repair; (12) Its noiselessness; (13) Its availability; (14) in the matter of cost.

COMPTROLLER'S DEPARTMENT A CENTURY OLD

On the 13th day of September the Comptroller's office of New York City rounded out one hundred years since its establishment. The first comptroller of New York was appointed by a vote of the aldermen because of the friction existing between that body and the treasurer of the city. Under the ordinance which established the office of comptroller, he was authorized to act as the financial agent of the aldermen in examining and liquidating all claims due the corporation. He also had supervision of the money collected by other officials. The salary attached to the office was \$1,500 a year.

Since the inception of the office there have been twenty-five comptrollers. The duties of the first comptroller were insignificant as compared with those exercised by the present incumbent. He had nothing to do with collecting the taxes and was really but an auditing officer for the board of aldermen. At that time the total budget of the city amounted to \$110,691.29; in 1902, it was \$98,619,600.88. The total assessed valuation in 1802 was \$21,964, while to-day it is \$3,857,047,718.

In 1857 the office of comptroller was placed among those of the elective offices, such as the mayor and council, and it was also provided that the comptroller be voted for on a separate ballot. It was at this time that the department of finance of the city was set aside from other departments and the comptroller was placed at its head. Under the department were five bureaus.

The trouble which followed the Tweed regime developed a feature in the comptroller's office that has remained ever since. That is the re-examining and inspection by the Department of Finance of all work done for the other departments of the city. In 1873 a "Reform" charter provided for the appointment of the comptroller by the mayor with the consent of the board of aldermen, and placing the term at four years. Eight bureaus were provided for in the department. This charter also made the comptroller the financial officer of all the other departments of the city. Since then the comptrollership has been steadily advanced by extending its duties and making the comptroller a member of nearly all the boards of city government.

PARK DEVELOPMENT AND MAINTENANCE

Difference Between Park and Civil Engineers—Proportion of Park to City Area—Methods of Raising Money for Park Purposes—Cost of Construction Per Acre

By G. A. Parker*

I WANT to emphasize the fact that park architects and engineers require a special training or peculiar adaptability in order to become successful in this work, just the same as the waterworks, sewerage, bridge or railroad engineer requires a special training for success in his line.

DIFFERENCE BETWEEN PARK AND CIVIL ENGINEERS

As a rule, engineering work requires exactness of detail as to lines and surfaces, but in parks the engineer's idea of exactness of detail becomes an offense, for it is not the perfection of detail, which gives pleasure here. It is the relation, the proportion and correspondence of things that brings satisfaction.

That a different mental makeup is required in the park engineer from his brothers in the other lines of work is illustrated by the fact that a man with an engineering mind delights in the exactness of lines and angles and the mastery of forces, and so is all at sea when he comes to park work. To the engineer the point on a plan is always larger than his conception of its size, while the dot of an ink stopple more fully represents the point to the landscape mind. In the field, when the engineer establishes a point he drives a stake, puts in a tack and makes cross lines on its head; but to the park man, a point is a quarter of an acre or more. The true engineer is disturbed by all this indefiniteness. I am not belittling engineering skill, for parks cannot be made without it, but it is only the skeleton which sustains the flesh; that is, the moulding of the soil with its rounded surface. The trouble with the engineer seems to be that he wants to put the skeleton on the outside where the turtle has his, but if he does so he produces no higher grade of landscape work than the mud-turtle is among animals. I honor and admire the skill of the engineer. I know only too well its fundamental importance in the foundation study of parks, but in parks it must be hidden and never appear on the surface.

PROPORTION PARK AREAS

I have visited over a thousand of the six thousand parks, squares, and public areas of the United States, and my conclusion as to park areas for cities and their relations to its population, income, and valuation is as follows: First, areas of parks as related to area of cities.

One twentieth of the city's area should be reserved for parks and squares. A playground should be allowed at least 300 feet square to every square mile, and in densely populated sections, more than one. Four other small squares should be allowed to the mile, of at least $\frac{1}{2}$ an acre each. A thousand acres would then be divided as follows:

- 10 acres in playgrounds and squares.
- 40 acres for large parks.
- 100 acres in streets and alleys.
- 5 acres in school grounds, etc.
- 155 acres for public purposes.
- 850 acres for private ownership.

Does 15.5 per cent. seem a large proportion to give up to public uses? Yet one-third of the cities already exceed that amount. It is probable that in 20 per cent. of the cities one acre in five is devoted to public use. This will go far towards preventing over-crowding and make the other four acres more valuable. Already, twenty-two cities in the United States have one acre in twenty devoted to park purposes. Second, as to finances.

METHODS OF RAISING MONEY FOR PARK PURPOSES

A most common method of raising money for park purposes is by bonds for the purpose of land, construction and other extraordinary outlays, and by appropriations in the annual city budget for the cost of maintenance or other ordinary and transitory expenses.

* Superintendent Keney Park, Hartford. This is a digest of a paper read by Mr. Parker before the ninth annual session of the American Society of Municipal Improvements, held at Rochester, N. Y., October 7-9, 1902.

It has usually been found that if the appropriations are dependent upon the vote of the city government the politicians keep the park within their grasp. The parks are for the public and the public should at all times control them, but as a tree cannot flourish in having an over abundance of water one month and none at all the next so the park must have a steady supply of funds necessary for the care of its plant life, and to keep it in such order as to be reasonably protected, clean and inviting to the public. That it may be so, an ever increasing number of cities are having the money necessary for their park maintenance set aside by the treasurer or that officer whose duty it is to establish the rates, the same as fixed expenses, such as interest and money for the sinking funds, are raised. For instance, if a half mill tax on total valuation is set aside in this way by provision in the charter it does not come up to be voted upon by the city government.

In the study of the cost of park maintenance, it is found that the cost in many cities of over 50,000 population equals or exceeds one-half mill on assessed valuation, or sixty cents per capita, or 2 per cent. of the total income of the city.

If there is one acre of park to two hundred inhabitants and a tax, equal to sixty cents per capita, is raised, there would be \$120.00 per year per acre, for ordinary park expenses, which, while not sufficient for very large cities where the cost of policing and lighting is considerable, yet it is ample for moderate sized cities,—certainly for cities under 100,000 population.

COST OF CONSTRUCTION

It is usual to raise money by bonds for park construction and provision should be made for them if needed. As it costs about \$2,000 per acre for thorough construction work—some parks have cost many times that—and if there is an acre of park to two hundred people, then the bonded indebtedness should not exceed ten dollars per capita. If the bonds run for thirty or forty years, then the total annual cost per capita, for park purposes would be about one dollar per person; less than two cents per week. That is, two cents per person per week may give to any city in the United States a satisfactory park system, and will give it, providing action is taken in time. A city can, for convenience or necessity, put off for years, entering into a well organized park system, but it cannot do so without sacrificing much and at an ever increased cost to its people when it does come, and it is sure to come in time. It is not essential to construct the park, or even to make it usable, but it is essential that the city as a whole should be well considered and after determining both the amount of land needed and its location that it be secured at once and then developed and rendered usable as the means and needs of the city require.

In conclusion, let me say that a new field of labor, a new profession is fast opening, namely, for an architect of cities. By this I do not mean an architect for its buildings, but for the construction of the city as a whole, the determining of the relative proportions and locations of its different functions. This is not a call to lay out new cities, for it is the people and not the land that make the city, but a call for a man who has the capacity to take in the existing conditions with the possibilities they present. Ruskin says, "Architecture does not begin until the utility of the structure has been provided for," so the architect of the city has no call until the city itself has been established, and while building the city, remember that the arts are but different methods of expressing the love of the Creator for his creatures, of man towards his fellow being, and this art will be no exception. Also, do not forget that while Nature does much, she does not make parks inside the limits of a city of 100,000 population, however profuse she may be in distributing them throughout the country.



Published Monthly by the
MUNICIPAL JOURNAL PUBLISHING COMPANY,
253 Broadway, New York

| | |
|------------------------|--------------------|
| WILLIAM S. CRANDALL, | MANAGING EDITOR |
| WEBSTER WAGNER, | ASSISTANT EDITOR |
| EMIL KUICHLING, C. E., | ENGINEERING EDITOR |

| | |
|-------------------|----------------------------|
| JOHN B. BENNETT, | BUSINESS MANAGER |
| E. T. WHITE, | ADVERTISING REPRESENTATIVE |
| E. B. COGGESHALL, | WESTERN REPRESENTATIVE |

TERMS OF SUBSCRIPTION
(Payable in advance.)

| | |
|--------------------------|-----------------|
| United States and Canada | \$3.00 per year |
| Foreign Countries | 4.00 " |
| Single Copies, each | .25 " |

Make all checks payable to the Municipal Journal Publishing Company.

Entered at the New York Post Office as second class matter

NEW YORK, NOVEMBER, 1902

Recent Progress in Cleveland Waterworks

IN two respects Cleveland to-day attracts the attention of all waterworks engineers, first in her recent initiation of the largest experiment with meters that has ever been made anywhere, and second in the completion of her nine-foot tunnel under Lake Erie by direct city work instead of by contractors.

Other cities have far more meters than has Cleveland, but no city has ever attempted to introduce meters so largely as is now being done here. At the beginning of the year there were only 3,540 meters and elevator indicators, while on the first of October there were 10,000, and by next April there will be 15,000. It is planned to continue the work with equal rapidity during the next year. In fact, unless the present administration is upset, of which there seems to be no immediate probability, it is likely that, by 1907, every one of the services, now numbering nearly 60,000, will be metered.

Preparatory to letting the first contract for 11,000 meters last winter, an investigation of the relative merits of the different varieties in the markets was undertaken. Four meters of each of the sixteen types then in the market were purchased. These sixty-four meters were then placed in four batteries, in each of which there were sixteen meters, so arranged that a meter of each type occupied each possible position. This somewhat economized the amount of water necessary to complete the test. After testing each meter on all sizes of streams down to a thirty-second of an inch, 25,000 feet of water was made to pass through each meter, and another careful test was made. Other tests of the amount of hindrance that each meter made to the flow of water, the number of revolutions of the disc in passing through a given quantity of water, etc., were also made.

These tests, and a large amount of personal evidence by the Superintendent and one of his engineers, and a wide correspondence with public and private companies using different types of meters, formed the basis for final judgment. In awarding the contract of course the price was a very important factor, but these tests prevented the city from selecting a meter merely because it was offered at a low price without regard to its being satisfactory. These tests, it may here be said, have never been published, but of late have been resumed, and will continue until only a few meters are left in good condition.

It is, of course, too early to determine whether meters will have the results in Cleveland that they have had in all other places, of so checking the waste as to more than pay for themselves by lessening the necessity for costly extensions of pumps, mains, etc., but a tendency in this direction is already manifest. From present indications this is likely to be the first year, since 1896, when there has

been no increase in the consumption of water, although few meters were set before summer, and the pumpage during the first four months of the year exceeded by 12 per cent. the pumpage for the corresponding period last year. As the pumpage last year was 169 gallons per capita per day, of which only 41 gallons were used by factories, hotels and business houses, (nearly all of which were metered) there is ample opportunity for ultimately decreasing the pumpage to at least 100 gallons per capita per day.

The other specially interesting feature of the present work of the Water Department above referred to, consists in the construction under direct city management of the last 3,600 feet of a nine-foot brick tunnel, five miles in length, which has been under construction since 1896. The contractors, after completing somewhat over four miles, with a loss of fifty lives, abandoned the work in the fall of 1901. The city was obliged to undertake its completion, after serious accidents had left the cribs and tunnel in a condition where great expense was necessary before any resumption of the actual tunnel work could be made. Prices of material were much higher than when the contract was let, and public sentiment rightly demanded of the city more expensive precautions for the preservation of life and health and welfare of the workmen than had been afforded by the contractors, prior to the accidents which ended their contract for the work. The city also, for a time, had serious labor troubles but has come out of these successfully, and the prospects are that the tunnel will be completed about December of this year.

Everyone concedes that the city has done its work well, and with small loss of life compared with the experience of the contractors, although the cost may be somewhat greater than it would have been under private management. Politics, however, have been entirely excluded, both in the employment of men, the purchase of materials and the general administration of the work.

There are other features of the Department's work, such as a careful analysis of the cost of construction and a proper allowance for the depreciation of the various portions of the plant, since the city introduced a water supply in 1857, which are treated in the annual report of the Department for 1901, to which only this passing mention can be given.

EDWARD W. BEMIS.

Ohio's New Municipal Code

THE special session of the legislature of Ohio, called by Governor Nash, to enact a new municipal code for that state, finished its work last month. The code adopted was practically the same as that drafted by the Governor and published in our October issue.

It provides that every municipality of five thousand population and over shall become a city and all under that a village. According to this there are seventy-two municipalities of the state which will thus become cities, the largest of which is Cleveland, with a population of 381,768, and the smallest, Nelsonville, with 5,442 people.

The elective officers are designated as mayor, president of council, member board of public service, auditor, treasurer, solicitor and councilman. All are elected for a term of two years except the auditor, whose term is for three years.

The mayor makes all appointments except those under the board of public service, has the veto power, may require reports of any subordinates, may call the heads of departments to meet with him at any time, makes up and presents the annual budget to the council, and may remove any officer or head of any department for bribery, misconduct, misfeasance, malfeasance, or nonfeasance. The trial of such charges shall be by the council. The mayor may be removed by the Governor on written charges for misconduct in office, gross neglect of duty, bribery, gross immorality or habitual drunkenness.

The president of the council becomes the acting mayor in the absence of that official or his temporary disability.

The board of public service is the principal administrative body of the city. It is to be composed of three or five members, as council may determine, who are to be elected for two years each. It has charge of all public works. It has full power to make contracts. It fixes the number of its employes and their compensation, and the only check council has on its action is by its power to limit appropriations. It has absolute power to remove all its men, subject only to the general supervision of the mayor.

The chiefs of police and of the fire department are to be appointed by the mayor, they being given full power to administer the affairs of their respective departments.

Provision is made for a public safety board, civil service board, board of health and tax commission.

A radical step is taken in limiting the membership of the city council. The minimum number of councilmen is seven, of whom four shall be elected by wards and three at large. For the first 20,000 population above the original 5,000, two additional councilmen shall be elected by wards; for each 15,000 above 25,000, one additional councilman shall be elected. When the number of councilmen is fifteen or more, one-fifth shall be elected at large. The general powers of the council are as heretofore provided, with a number of new provisions of minor importance. The compensation of the members of this body is limited to \$150 per annum in cities of 25,000 or under, and for each additional 30,000 in population shall be paid an additional \$100 per annum, but in no case shall their compensation exceed \$1,200 per year.

Taken as a whole, the new code is preferable to the old, and Ohio cities cannot fail to reap much benefit from the change.

Voting Machine Experiments

The latest attack which has been made upon the voting machine is by an expert in Buffalo. When the machines were recently inspected, an unknown person asked for the privilege of showing how they could be tampered with so as to give an incorrect report. He was given a free opportunity to do so and fully demonstrated that under such conditions the machines might not be relied upon. Very aptly, however, one of our contemporaries, the *Democrat and Chronicle*, of Rochester, N. Y., remarks:

"We have seen descriptions of curious performances by voting machines under the manipulation of 'experts.' In every case the 'experts' did things that would not be allowed at an election, and which, if attempted, would cause the arrest of the offender. If you should place a box on a table and a bunch of official ballots in the hands of an 'expert,' and permit him to mark the ballots and put as many of them as he pleased into the box, that would not be a sign that he could 'stuff' the box on election day, nor would it in any way condemn the system of voting by ballot under the regulations and safeguards provided by law. But it would be parallel with certain recent attempts to discredit the voting machines. The machines used in Rochester and many other cities are perfectly reliable and make no mistakes. The voter cannot 'beat' them unless he has free license to disregard the directions for using them. In such a case the inspectors could not conceal their connivance, and they would go to state's prison. No 'expert' once behind the properly drawn curtain, can make the machine lie."

Rather Hard on Chicago

One of our foreign contemporaries quotes a visitor to Chicago as saying, "I never saw a street-sweeper in Chicago. When a brisk wind blows you cannot see across the road for gritty dust, which hurls at you like a tornado. So you turn your back and close your eyes to receive it. The roads are bad; rough cobbles, skull-sized in the main streets, and just mother earth in the suburbs. When it rains the streets are masses of greasy filth. In the poorer parts of the town there is no sewage scheme. If there is, it is ineffective, for I have seen streets half-full of slime and stenching matter. Chicago is too busy money-making to attend to civic improvements.

"A wretched sight was the children running the streets—little Italians, Jews, Hungarians, Swedes, Poles, Russians, a motley crowd of half-starved, bare-footed, ragged-clad little ones—quite happy, however, paddling in the stenching overflow of sewage."

This is rather a severe arraignment of Chicago and not altogether deserved, for in many respects the citizens are very wide awake, and are doing a great deal toward creating a better-governed and cleaner Chicago. This critic happens to be an Englishman. If he takes the pains to look into the history of London he will find that Chicago is comparatively clean to what London was one

hundred years ago. At that time London was several centuries old and should have been clean. Chicago was not incorporated as a town until 1837 and the greater part of its growth has been during the last fifty years. There is more pent-up energy in the Windy City than will be found in all the cities of Europe. Chicago is developing and is destined to be as clean and as well governed as any city in the world.

EDITORIAL COMMENT

The American Public Health Association will meet at New Orleans, December 8-12. We are making arrangements for a party to leave New York by special car, Saturday, December 6th, at 4.25 P. M., which will arrive at New Orleans the following Monday morning, December 8th, at 7.25. Communicate with us at once for railway terms, hotel rates, etc. Take time by the forelock and engage your berth and room now while you can have a choice.

This is a good time of the year for the up-to-date alderman to draft an ordinance requiring all wires to be placed underground in the business section, provided it has not already been done.

A digest of the leading papers and reports which were presented at the Rochester meeting of the American Society of Municipal Improvements will be found in this issue. For lack of space, several valuable papers have been omitted, but will appear in subsequent issues.

Through a misunderstanding, we used, without permission, in our August issue, a panoramic view of San Francisco and Bay, copyrighted by Mr. Edward H. Mitchell, of San Francisco, and inadvertently omitted the copyright imprint.

The City Council of Tacoma is endeavoring to make the property owners pay for the water mains. This is an unprecedented procedure and should not be tolerated by the citizens of that municipality. It is absurd on the face of it. If a private water company were to make such a proposition to a city it would be laughed at, and if it sought to put it in operation, it would more than likely result in a riot. The expense of water mains should be borne by the water department, of course.

The good roads train, which started in September for a trip through the Northwest under the direction of the Hon. Martin Dodge, Director of Public Road Inquiries, has been abandoned because the interest in that section of the country was not sufficient to warrant its continuance. Mr. Dodge, however, continued his trip to the Pacific Coast, and is making daily addresses for good roads throughout the Great West. Wherever he gets a hearing he is sure to make converts to the good roads cause.

American cities give too little attention to the introduction of fire proofing materials. They seem to think that so long as they furnish the best fire fighting force in the world they have discharged all their responsibilities, but such is not the case. "An ounce of prevention is worth a pound of cure," is a trite saying, but it was never truer than in this connection. We are proud of our fire departments because they are the best in the world, but it is now time for us to pay more attention to fire prevention methods. For this reason fireproof materials should be more generally used.

Elevators continue to fall and inflict injury or death upon their occupants. These accidents occur wherever elevators are in use with the exception of those which are fitted with some safety device, similar to the air cushion installed in the Philadelphia City Hall in September. The up-to-date aldermen here have an opportunity of performing an invaluable public service by the passage of an ordinance which will make necessary the installation of an elevator safety air cushion in connection with every elevator operating within the city limits. This is a matter which should receive more general attention.

If the people of New York were to vote as to who should be retired from the fire department, Commissioner Sturgis or Chief Croker, there is little doubt in the mind of the public that the Commissioner would have to go. As we go to press the fourth week of the trial of Chief Croker is drawing to a close. The decision of the Commissioner is a foregone conclusion. A failure to convict Chief Croker of the charges against him is impossible because the man who makes the charges is acting as his judge. He was condemned before the trial began. The trial has been a farce from the beginning to the present time. The courts will have something to say about the reinstatement of Chief Croker.

The last municipal convention of the year will be far from the least in importance. The American Public Health Association is scheduled to hold its thirteenth annual session at New Orleans, La., December 8th to 12th. The importance of the work of this organization is indicated by the personnel of its fifteen hundred members, the topics discussed and the fact that its published annual proceedings make a volume of some five hundred pages. The membership includes not only health officials but a very large number of public spirited citizens who are interested in promoting the general health of the country. A fine programme has been arranged for the next meeting, which will be published in full in our next issue.

It is an interesting fact to record that more than ten thousand electric cars in use in the United States are equipped with an efficient car fender. The names of one hundred and fifty-eight electric roads in the United States are on the honor roll. There are many street railway companies which have their cars equipped with apologies for fenders, as in Brooklyn, Rochester, N. Y.; Springfield, Mass.; Grand Rapids, Mich., and several others. There is no excuse for a street railway neglecting to use a fender that is a saver of life, for such fenders are made and can be easily had, if desired. It is a case of criminal neglect on the part of the city officials as well as the transportation company officials not to have all cars so equipped.

This is the time of the year that various municipal organizations should make plans for the coming season. The first step in the adornment of a city is to introduce those features which add to the comfort of the general public, such as the installation of drinking fountains in parks and public squares, and the introduction of settees and chairs. Too little attention is given by city officials to the general question of municipal art. There is no good reason why the electric light poles, trolley line poles, and other equipments necessary to the street, should not be of an artistic design. While it is not always possible to make them add greatly to the beauty of the city, yet it is possible to make them less obtrusively ugly, and at little or no increase in the expense.

We wish to extend hearty congratulations to St. Louis upon the possession of an official so successful and efficient as Mr. Joseph W. Folk, Circuit Attorney. In his exposure of the corruption in that city he has worked against great odds and almost alone. Some of the great and good men, including the financiers, merchants and churchmen, of the city have used their best endeavors—be it said to their shame—to dissuade him from his righteous purpose to do his duty as he saw it, namely, to catch and convict the criminals who by bribery and other methods had been prostituting the municipal administration, regardless of whether the criminals were high or low, rich or poor. All honor to Circuit Attorney Folk! We are only sorry that his like is not found in every large municipality in the United States.

Our esteemed contemporary, the Youngstown, Ohio, *Telegram*, calls attention to the need of an inspector whose duty it shall be to prevent contractors from destroying the property of the taxpayers. As an evidence it cites the following: "A trench was dug on Federal street and when the contractor ran into a drain pipe with his conduit he deliberately severed the former, plugged up each end with cement and continued up the street. When the first big rain came the owners of a store tried to flush their drain with a fire hose and nearly got blown out of the cellar for their pains." It says this is only

one of many. What is true of Youngstown is undoubtedly true of a majority of American cities. There should be well trained inspectors in every city to attend to such matters. If they were of the right sort they would save many times the amount of their salaries during the year.

Alderman Judson of Rochester, N. Y., proposes to make a radical change in the method of paying for street lighting. Instead of an annual appropriation made from the general fund, he proposes to assess abutting property for the cost of the lighting of a given street. In this case the city at large would be called upon to pay for only the lights which were in front of public property. The assessments would be levied and collected in the same manner as the street sprinkling assessment. Such a system would certainly be to the advantage of the small property owner and to those living in the suburbs, for then they would only have to pay for the comparatively small amount of light with which they are favored, whereas under the present system they have to pay their share of the expense for lighting the business and other important streets, from which they reap very little benefit.

Some months ago, at the time of the great strike, we had occasion to criticize very severely, Mayor Black, of McKeesport, for what appeared to be a misuse of his official position. Although we took particular pains to secure our information from a resident of McKeesport, it now appears that our informant was not unbiased. From several sources, including a member of the staff of one of the local newspapers, which at that time was not altogether friendly to the Mayor, we learn that our strictures were not altogether deserved. In justice to Mayor Black as well as to ourselves, we wish to call attention to the fact as stated by one of our correspondents, "The Eastern papers did misrepresent conditions here to a very great extent, and the Mayor was liberally misquoted in the interviews attributed to him." As this is the testimony of one of the editors of the leading papers, and one which is not over friendly to the Mayor, it puts a different light on the matter.

By a recent decision of the Superior Court of Connecticut in the case of the city of Hartford against the State Railroad Commissioners and the Hartford Street Railway Company, it has been decreed that Connecticut municipalities have practically little control over their streets. The dispute arose over the kind of pavement to be used by the street railway company between its tracks and rails, the city desiring one kind of pavement and the company another. The matter was taken to the courts and the recent decision handed down by Judge Ralph Wheeler is against the city. The question at stake is a vital one and is interesting to all municipalities, although fortunately, very few are placed in the embarrassing position now occupied by those located in Connecticut. It was argued by the City Attorney that the street railway company could only lay such pavement—quoting from the state law—"as shall be to the satisfaction of the authorities of the city according to the law of 1893." The case has been appealed to the Supreme Court and its outcome will be watched for with interest.

Convention Dates

NOVEMBER

The Indiana State Municipal League will meet at Madison, Ind., on November 12-14. George E. Downey, Aurora, Ind.

The Charities and Corrections State Conference will be held at Rochester, Minn., November 18-20. Miss Anna Swanson, 2012 14th avenue, Minneapolis.

The State Good Roads Association meets at Jacksonville, Fla., November 26. J. W. White, Jacksonville.

The Indiana Charities and Corrections State Conference will be held at Indianapolis, Ind., November —. C. S. Grout, 156 E. Market street, Indianapolis.

The Missouri Charities and Corrections State Conference will be held at Sedalia, Mo., in November.

The New York State Conference of Charities and Corrections will be held at Albany in November. Edward T. Devine, 105 E. 22d street, New York City.

DECEMBER

The thirteenth annual meeting of the American Health Association will be held in New Orleans, La., December 8-12. Dr. Chas. O. Probst, secretary, Columbus, O.

The League of California Municipalities will meet in convention at San Jose, Cal., December 10-12.

FEBRUARY

The National Brick Manufacturers Association will hold its seventeenth annual convention at Boston, Mass., February 4-7. Theodore A. Randall, Secretary, Indianapolis, Ind.

LETTERS TO THE EDITOR

The Cost of Lighting Large Cities

SAVANNAH, Ga., September 28, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

If you have statistics on hand showing the cost of electric lighting in cities between 50,000 and 100,000 population, I would greatly appreciate it if you would send them to me. What is desired is the cost per light of 600-candle power in each of these cities, with the cost of fuel.

HERMAN MYERS, Mayor.

The following articles have appeared in recent numbers of the MUNICIPAL JOURNAL AND ENGINEER, and contain much information, statistical and otherwise, that will be of value on this subject: "Common Sense in Street Lighting," by Edward B. Ellicott, City Electrician of Chicago, published June, 1901; "Largest Street Lighting Plant in Massachusetts," by Alton D. Adams, published, August, 1901; "Electric Lighting Statistics for American Cities," from 1,000 to 11,000, published January, 1902; from 12,000 to 200,000, published April, 1902. "Municipal Lighting Statistics," including cities large and small, published August, 1902.—[EDITOR.]

Successful Municipal Lighting

ROCKFORD, Ill., October 16, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

I am seeking information regarding municipal ownership of lighting plants. Have you a list of cities where it has been tried?

CHARLES E. JACKSON, Alderman.

Information about the operation of municipal lighting plants, statistical and otherwise, will be found in back numbers of the MUNICIPAL JOURNAL AND ENGINEER, as follows: A description of the Municipal plant at South Norwalk, Conn., including a detailed account of expenses, in the May issue, 1901; "Common Sense in Street Lighting," by Edward B. Ellicott, City Electrician of Chicago—a paper read before the Charleston meeting of the League of American Municipalities—published in June, 1901; "Acetylene for Municipal Lighting Plants," by Augustine Davis, published July, 1901; "Largest Street Lighting Plant in Massachusetts," by Alton D. Adams, published August, 1901; "Municipal Ownership of Public Utilities," by Walter S. Allen, published August, 1901; "Public Ownership of Public Utilities," by Lee Meriwether—a paper read before the Jamestown meeting of the League of American Municipalities—published October, 1901; "A Successful Municipal Lighting Plant," published February, 1902; "Electric Light Rates,"—a comparison of prices between several municipal and private plants in Western states—published May, 1902; "Municipal Lighting Statistics"—a full page—published August, 1902.—[EDITOR.]

Can Waste Paper Be Sold at a Profit?

BIRMINGHAM, Ala., October 17, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Our city has recently cancelled all contracts for the removal of garbage and this work is now being done by our Street Commissioner. I find the present arrangement gives almost universal satisfaction. Our Street Commissioner states that the removal of waste paper alone, in the business portion of the city, constitutes at least one-fourth of the garbage to be removed, and he is of the opinion that we can save this paper and have it pressed into bales at a very small cost. I will thank you if you will furnish me with the names of

firms or corporations that buy such paper. I prefer the names of those located nearest Birmingham.

W. M. DRENNEN, Mayor.

The following concerns deal in waste paper and their terms can be had on application: James M. Fitzgerald, 268 West street, New York City; Chase & Norton, 277 Water street, New York City; Darmstadt & Scott, 184 South street, New York City; Merrimac Paper Co., 2515 Fletcher street, Philadelphia, Pa.; J. L. Linhart, 246 North Delaware avenue, Philadelphia, Pa.; Hoopes & Radford, 1018 Ashland street, Baltimore, Md.; Broderick Brothers, 608 West Pratt street, Baltimore, Md. No price can be quoted, as the rate per hundred weight depends entirely upon the grade and condition of the paper. The various kinds, such as news, wrapping, manila, straw, etc., must be separated and baled in separate packages.

In Boston a private plant is in operation, which was installed four years ago by Col. Morse of the Morse-Boulger Destructor Company, Inc., 39 Cortlandt street, New York City. This plant handles about thirty-five or forty tons of waste paper per day, saving some 60 per cent, which the private company sells at a profit. The remaining 40 per cent. is used as fuel to produce power for the operation of the plant, a special destructor being installed for that purpose. By the use of this destructor it permits of an economical operation of the plant. We should think that a similar plant might be installed in Birmingham and be a means of saving to the city. Full particulars may be learned by communicating with Col. Morse.—[EDITOR.]

Prices Charged for Hydrants

DAVENPORT, Ia., Sept. 22, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Can you furnish me the fire hydrant rates charged by a number of cities of from 40,000 to 100,000, and inform me whether the water works are run under municipal ownership or by private companies.

WALDO BECKER, Mayor.

Immediately on receipt of the above letter, inquiries were sent out to the various cities concerned and the following replies have been received up to the time of going to press.—[EDITOR.]

| | Population. | No. of Hydrants. | Charge per Hydrant for Fire Protection. | Total Cost of Water Used for All Purposes. | Water Works Owned by City. |
|--------------------------|-------------|------------------|---|--|----------------------------|
| Akron, O. | 42,728 | 286 | 9,560 | ..... | N |
| Albany, N. Y. | 94,151 | 842 | N | 300,000 | Y |
| Atlanta, Ga. | 89,872 | 1,231 | 50 | ..... | Y |
| Brockton, Mass. | 40,063 | 488 | 3,000 | ..... | Y |
| Dallas, Tex. | 42,638 | 177 | 23,520 | ..... | Y |
| Dayton, O. | 85,333 | 1,200 | N | ..... | Y |
| Des Moines, Ia. | 62,139 | 1,100 | \$3.50-mi. | \$3.50-mi. | N |
| Duluth, Minn. | 52,969 | 545 | \$80, \$60 | 40,271 | Y |
| Elizabeth, N. J. | 52,130 | 260 | 6,500 | ..... | N |
| Erie, Pa. | 52,733 | 632 | N | ..... | Y |
| Evansville, Ind. | 59,007 | 500 | N | ..... | Y |
| Fall River, Mass. | 104,863 | 991 | N | ..... | Y |
| Ft. Wayne, Ind. | 45,115 | 710 | N | ..... | Y |
| Grand Rapids, Mich. | 87,565 | 1,366 | N | ..... | Y |
| Harrisburg, Pa. | 50,167 | 639 | 30 | ..... | Y |
| Hartford, Conn. | 79,850 | 981 | 18 | ..... | Y |
| Hoboken, N. J. | 59,364 | 1,126 | 35 | ..... | R |
| Holyoke, Mass. | 45,712 | 201 | 3,000 | ..... | Y |
| Houston, Tex. | 44,633 | 572 | \$30-\$40 | 24,360 | N |
| Kansas City, Kan. | 51,418 | 350 | 14,000 | ..... | N |
| Lancaster, Pa. | 41,459 | 543 | 25 | ..... | Y |
| Los Angeles, Cal. | 102,479 | 700 | ..... | ..... | Y |
| Lowell, Mass. | 94,969 | 1,157 | N | \$1.40 M ft. | Y |
| Lynn, Mass. | 68,573 | 790 | N | ..... | Y |
| Manchester, N. H. | 56,987 | 760 | 25 | 23,000 | Y |
| Nashville, Tenn. | 80,865 | 667 | 44,556 | ..... | Y |
| New Haven, Conn. | 108,027 | 800 | \$2,000 | ..... | N |
| Omaha, Neb. | 102,555 | 1,600 | \$1 yr. | ..... | N |
| Portland, Me. | 50,145 | 365 | 4,000 | ..... | N |
| Portland, Ore. | 90,426 | 590 | N | ..... | Y |
| Reading, Pa. | 78,961 | 760 | N | ..... | Y |
| Richmond, Va. | 85,050 | 600 | N | 15,000 | Y |
| San Antonio, Tex. | 53,321 | 750 | 24,000 | ..... | N |
| Scranton, Pa. | 102,026 | 241 | * | ..... | N |
| Somerville, Mass. | 61,643 | 970 | N | ..... | Y |
| Springfield, Mass. | 62,059 | 964 | 20 | 32,797 | Y |
| St. Joseph, Mo. | 102,979 | 753 | 40 | 32,000 | N |
| Syracuse, N. Y. | 108,374 | 2,690 | N | ..... | Y |
| Troy, N. Y. | 60,651 | 959 | N | ..... | Y |
| Utica, N. Y. | 56,383 | 454 | 10,000 | ..... | N |
| Waterbury, Conn. | 45,859 | 412 | N | ..... | Y |
| Wilkes-Barre, Pa. | 51,721 | 245 | 20 | 5,038 | N |
| Wilmington, Del. | 76,508 | 679 | N | ..... | Y |
| Yonkers, N. Y. | 47,931 | 597 | 16,290 | ..... | Y |

Where large amounts are given for hydrant service, it signifies that that is the total amount charged for all hydrants.

N No. Y Yes. R City owns mains and hydrants only. * Scranton Gas & Water Co., \$3,000; Providence Gas & Water Co., \$1,000. N Nothing.

Personalities

—It is reported that Mayor L. C. Williams of Marysville, Cal., has resigned his position, giving ill health as the reason.

—Mayor Edward S. Wilkinson of North Adams, Mass., died on the 14th of October at the City Hospital at Albany, N. Y.

—City Treasurer James Stuart of Port Huron, Mich., was recently thrown from a train and miraculously escaped from death by falling on a soft embankment.

—Mayor Marshall Hicks of San Antonio, Tex., has been nominated for the State Senate. Strange as it may seem, although Mayor Hicks is a Texan, he does not play poker.

—After proving his ability to handle the business of the mayoralty, Mayor Joseph E. Nowrey, of Camden, N. J., recently blossomed out as the clever ring master at a circus given by one of the regiments.

—Comptroller A. M. Heston of Atlantic City, N. J., has been compelled to leave the city for a month or so on account of his health, which has broken down under the strain of his official duties.

—At a recent labor meeting Mayor John F. Hurley of Salem, Mass., made a savage attack on the coal operators and in the course of his remarks expressed the desire to hang President Baer and his associates.

—Mayor David S. Rose of Milwaukee, Wis., who is the Democratic candidate for governor of Wisconsin, has been touring the cities of the State in company with Mayor Rakow of Burlington and Mayor Higgins of Racine.

—Mayor William C. Maybury of Detroit, Mich., was unanimously nominated for mayor on the Democratic ticket. This is the fourth time that Mayor Maybury has been made the standard bearer of the Democrats in Detroit.

—Trustee Elkus of Sacramento, Cal., recently proposed that the street sweepers be uniformed and provided with a star and be given the authority of special policemen. The last he asked to protect the men from the reckless driving in the streets.

—The Hon. Silas Dewey Drake, who is the owner and ruler of Lincoln, N. J., has agreed to furnish fuel free of charge to all of the three hundred inhabitants until next May. Mr. Drake owns several acres of woodland and will allow anyone to go there and cut as much wood as is required.

—The aspirations of Mayor Denis Mulvihill of Bridgeport, Conn., for the Democratic nomination for sheriff were rudely shattered when His Honor found that enemies in his party were sure to defeat him. So he withdrew from the contest and Robert L. Clarkson of Stratford was nominated for the office.

—Realizing the great suffering that would come to the poor this winter on account of the scarcity of coal, President Hiram Edgerton of the Common Council of Rochester, N. Y., has offered to divide his supply of coal with the poor and asks that others in the city who are abundantly supplied do likewise.

—President Finnegan of the village of Mechanicsville, N. Y., recently notified the officer in charge of the State Militia, that had been sent to the village to restore order because of the strike on a railway, that deputies would be sworn in and every soldier in the village would be arrested and locked up. The order was not, however, carried out.

—County Attorney Breen recently secured warrants for Mayor Davey, Chief of Police Reynolds, City Attorney Lamb, Judge Boyle and four police officers of Butte, Mont., on the two charges of contempt of court and disturbance of the peace. The trouble grew out of the arrest of a pool room keeper by order of the City Attorney, despite an injunction restraining the officials of Butte from interfering in any way with the pool rooms.

—Superintendent of Water Works John B. Heim, of Madison, Wis., has been re-elected after much opposition on the part of Mayor Groves and another water commissioner. Commissioner Steenland, who was recently elected a commissioner, cast the deciding vote in favor of Mr. Heim because he said that he had become

satisfied that the Superintendent was capable, efficient and a good servant of the city.

—Mayor W. Melville Drennen of Birmingham, Ala., has stated that he is greatly in favor of the city building its own water works plant. Mayor Drennen also hopes that the Legislature will pass a bill exempting all new manufactories from State, county and municipal taxation for he says that these locate just outside the limits of the cities to escape taxation from that source, while if no city taxes were levied they would come inside and so be subject to street and other local assessments.

Municipal Oddities

HOG OR NO HOG.—At a recent election held at Elkton, Md., for a mayor and councilmen the former mayor was elected, but for the last three years politics has had to take a back seat in the municipal contests, the main issue being made whether or not hoggens should be restored within the city's limits. Being narrowed down to hog or no hog this year, the anti-hog candidates were elected by a majority of seventy-five.

HEADLIGHTS ON BABY CARRIAGES.—The absurd lengths to which ordinances and by-laws of a city may be carried is well illustrated by a recent by-law in the English city of Kent. An order of the Kent County Council included in the law requiring lights on vehicles the carrying of lamps on all baby perambulators under penalty of a fine of \$10. This may have been an indirect way of enforcing a curfew law on infants.

AN OFFICIALLESS TOWN.—The town of Danville, Ill., recently found itself in a peculiar predicament. It was without a mayor, treasurer and all laws and ordinances. The mayor, Charles, Goof, died from the effect of a wound received while on a hunting trip and the treasurer had resigned and left for the far West. Meanwhile a fire destroyed the city offices, including all the records and ordinances, which, it is needless to say, were not in proper fireproof vaults.

MUNICIPAL MINING.—Owing to a recent decision by the Supreme Court of Montana, the city of Butte will be in a position to start mines under the city streets. No ore is known to exist under the thoroughfares, as yet, but the possibility of their existence makes the hearts of the authorities beat a bit faster. The court has decided that the city owns the mineral rights under certain streets and alleys dedicated to it. If ore should exist under the streets in paying quantities and a subway for rapid transit should be needed, it would solve the problem of expense for the profits from the sale of the ore, would pay the cost of construction and the mining of the ore would provide the necessary excavation for the tracks.

A NAVY YARD TOWN.—An interesting state of affairs has been brought to light due to the introduction of a bill into Congress by a senator from Florida to provide for two public schools, one for white, the other for colored children, in the town of Warrington, Fla. This town is located within the limits of the naval reservation at Pensacola and was started by the employees in the navy yard not long after the War of the Rebellion. These men "squatted" on the vacant lands adjacent to the yard and obtained permission of the Navy Department to build homes thereon. Even after the temporary activity of the navy yard had given place to the twenty years of lethargy into which the navy fell, the town grew in size and took a name. A post office was established and now the place has about 300 houses, six churches, several stores and a population of 1,500. The commander of the yard rules the town and the inhabitants have no votes and pay no taxes. The policing of the place is included in that of the rest of the reservation. The sewer system and electric lights were installed and are maintained by the Bureau of Yards and Docks. Very few of the people are now employed by the Government, but are engaged in fishing and farming. To make things complete for these people who are enjoying a free town, the senator wants the Government to build free schools.

NEWS AND PRACTICE AMONG THE CITIES

Parks of Chicago—Care of Trees in Washington—City Buys Asphalt Plant—Track Elevation in Milwaukee—Detroit's New Intake

MINERAL PRODUCTS OF CALIFORNIA.—The value of the structural materials such as would be suitable for road building in the State of California, has been estimated by State Mineralogist Lewis E. Aubury to amount to over \$2,900,000. This includes sand, paving blocks, macadam, limestone, granite, clays and cement. There are 21,364 tons of asphaltum valued at \$313,219, and 24,052 tons of bituminous rock valued at \$66,354.

"WEIGHING-IN" A MAJOR.—At High Wycombe, Eng., recently the ancient custom of "weighing-in" the mayor was observed. Mr. Walter Birch was elected for a second year of office, and after the election was duly weighed by the inspector of weights and measures. During his year of office he gained three pounds in weight. After the mayor, the aldermen, councillors, and corporate officials were weighed. The ancient custom goes back to the year 1285.

WHOLE TOWN POISONED.—Many citizens of the town of Mapimi, Mexico, were poisoned recently by using the water supply. Great sensation was caused at first when a large number of cases of poisoning developed in the town, and the officials were at a loss to account for the plague. Investigation, however, showed that a natural spring of arsenic had broken out near the source of the water supply, and this mixing with the other water was distributed to the town.

CHICAGO'S WATER SUPPLY IMPURE.—The water supply of the city of Chicago is such that the health commissioner has deemed it necessary to warn citizens against it. While the drainage canal has removed the greater part of the sewage that polluted the lake there are still a number of sewers that discharge directly into Lake Michigan, and these are the source of the pollution. It is hoped that when the work on the intercepting system of sewers is completed that no more sewage will enter the lake, but until such time citizens are warned to either boil or carefully filter all drinking water.

THE PARKS OF CHICAGO.—Statistics compiled by the Municipal Library of Chicago show that the total area of the parks in the city is 2,285.47 acres. The average population to each acre of park is 743.2 and the park area per capita of population in square feet is 58.61. The park system is divided into four divisions with a total area of wards in acres of 122,008.32 with a total population of 1,698,575 or an average population per acre of 13.92. There are sixty-five parks in the city under the jurisdiction of four park boards and some of the parks are divided into portions each under the control of a different board.

CITY CANNOT DISTURB WATER MAIN.—The city of Scranton, Pa., has been restrained from interfering with the water mains of the Scranton Gas and Water Co. The city desired to lay a sewer through a certain street but found that a main of the water company was in the way inasmuch as it crossed from one side of the street to the other several times. The city brought suit to compel the company to move its main to one side of the street or the other, but the court has ruled that the city has no right to compel this action and has granted a final injunction against the city's interfering in any manner with the water main.

CITY BUYS ASPHALT PLANT.—The city of Binghamton, N. Y., has determined to purchase a paving plant and to do all the repairing of pavements instead of trusting to contractors for this work. The experience of the city in the past has been that the contractors have not kept their pledges very well in the matter of making necessary repairs and now the officials are to try the experiment

of running a plant themselves and see if durable pavements cannot be made at a fair cost. The city has not gone very deeply into debt for this experiment, spending only \$1,000 for the small plant. This was supplied by Robert Hooke of Chattanooga, Tenn., City Engineer of that city, a manufacturer of the well-known Hooke Combination Fire-wagon and Asphaltic Mixture Heater.

PROPOSED TRACK ELEVATION IN MILWAUKEE.—The committee of the Milwaukee (Wis.) Council which visited Chicago to view the work of track elevation there, are greatly in favor of the similar project proposed for Milwaukee. The manufacturers who are opposed to the elevation will be won over if possible and the committee feel that if they visit Chicago they will be convinced that elevation is the thing. Superintendent O'Neill of the track elevation in Chicago gave the committee some valuable advice from experience he had gained in the work in Chicago and stated that the manufacturers there who objected to the elevation have found out that their fears were groundless. The committee will draw ordinances modeled after those used in Chicago and it is hoped that in a year things will be in shape for work.

NEW RAILWAY FRANCHISE.—In granting a franchise to the Union Traction company, the Council of Bay City, Mich., followed the old ordinance in great measure, but there were a few changes of importance. The life of the franchise is to be thirty years. The time during which laboring men's tickets will be taken up is extended a half hour over that in the previous ordinance. The time now will be from 5:30 to 7 A. M. and from 5 to 6:30 P. M. The company will sell on the cars books containing six tickets for a quarter of a dollar and these shall entitle the holder to all transfers. The Council shall have the power to designate what pavement shall be laid between the tracks irrespective of the material on the rest of the street. When the company takes up any rails it must restore the street to its original condition. Whenever a car running on a double-tracked street stops, cars coming from the opposite direction shall stop within 100 feet of the standing car and wait until it starts before proceeding.

PRIZES FOR BEAUTIFYING CITY.—The city of Hamilton, Canada, has an association that not only has the beautifying of the city at heart, but also does things to carry out its theories. It is known as the City Improvement Society and annually distributes prizes for all kinds of improvement work. The last annual distribution was held in the City Council rooms and the proceedings were conducted by President R. T. Steele of the Society. Last spring the Society arranged for contests for window boxes and a local paper offered similar rewards for improvement work. The prizes were in the shape of money and were awarded to many girls and boys for window boxes and flower gardens. In his address President Steele spoke of the assistance received from the authorities in the matter of collection of garbage and of the endeavor of the Society to have a superintendent appointed to care for shade trees. A resolution was adopted requesting Council to take the matter in hand. Three cash prizes amounting to \$25 were presented to those ward foremen who had kept their streets cleanest.

NEW INTAKE FOR DETROIT'S WATER WORKS.—After an interval of nearly a year which was taken up with repeated tests of the water at various points about the city of Detroit, Mich., the Water Board has at last decided upon the point at which to locate the intake. This will be placed in Lake St. Clair at the end of one of the tunnels now under construction. Some red tape must be unwound, however, before the exact location of the crib can be determined as the approval of the local United States engineer and that of

Chief of Engineers Gillespie at Washington must be obtained. The Secretary of War must also give his consent as the crib will be located in navigable water. At the position proposed the water is thirty feet in depth and the tunnel, which is ten feet in diameter with eighteen inch walls, will be constructed under the river bed for a distance of about 3,000 feet and the portion under the water will be placed at a depth of seventy feet below the surface so as to secure its safety. It will have a capacity of nearly 150,000,000 gallons.

SEWAGE DISPOSAL AT SWINDON.—Formerly the method of disposing of the sewage of the Swindon Urban District Council, England, was by broad irrigation, but it was not a success and a better method of treating the sewage was necessary. Under the supervision of the borough surveyor a system of chemical and bacterial disposal was gradually effected. After screening the sewage it is treated with lime and ferrozene before entering the tanks. This causes a deposit of sludge, which, consisting very largely of lime, has a value as manure for grass lands. After leaving the tanks the sewage is distributed through filter beds which are over two acres in extent. The material of the beds consists of mill cinder and burned clay ballast. They are underdrained and ventilated with vertical pipes to insure aeration. A continuous filtration is allowed and this has proved to be the most satisfactory way of procedure as regards the purity of the effluent. Before finding its way to the water course the effluent is passed over land to insure a thorough purity. The average flow of sewage, exclusive of storm water, which is separately treated, amounts to about 900,000 gallons a day.

IMPROVEMENTS RECOMMENDED FOR LANCASTER.—The expert engineer, Mr. S. A. Grey, who has examined the water system of Lancaster, Pa., has reported several deficiencies in the works. In the first place the supply is not sufficient in all parts of the city at all times of the day. There is only one force main from the pumping station to the reservoir and standpipe and any accident to the pipe would seriously endanger the city from fire. An accident to the 10,000,000 gallon pumping engine would throw all the work on to the other pumps and they are not large enough to supply the demand. The fourth imperfection is the fact that the water at all times is not suitable for domestic use inasmuch as it is very roily after heavy rains and is in danger of being contaminated. The engineer recommends that a new thirty-inch force main be laid from the pumping station to the reservoir, that a new standpipe be erected at a higher elevation than that of the present one, and that a high duty pumping engine be substituted for the five or six million-gallon engines now in use. About \$155,000 is the estimated cost of putting in the improvements recommended, but this does not provide for a filtering plant that has been under consideration.

NEW RULES FOR CREMATORY.—Because of the many complaints brought against the employees of the garbage crematory at Portland, Oregon, the following rules have been adopted by the officials to correct the abuses: It shall be unlawful for any one to mix or place in the same receptacle, tin cans, glass, crockery, or any refuse material, or ashes, together with any kind of garbage; every householder must keep separate from the garbage all material not under that heading, and no scavenger will be allowed to mix the garbage with other material when being carried away. Fines of from \$5 to \$50 and imprisonment not exceeding twenty-five days, or both, will be imposed upon violators of these rules. Other ordinances prohibit the removing or transportation of any garbage through the public streets of Portland except during the hours of nine in the evening and eight in the morning, during the months from April to September, and between seven o'clock in the evening and nine in the morning during the rest of the year. In order to preserve the cleanliness of the streets it is unlawful for any one to deposit upon the street or upon any private premises, ashes, paper, refuse or garbage, and no one shall carry upon the sidewalk any rubbish, garbage or filth except the same be so covered as not to be offensive to pedestrians.

CARE OF TREES IN WASHINGTON.—One of the beauties of Washington, D. C., is the amount of trees that grace its streets. Even Paris has much fewer trees on its streets than are in the "Capital City." The work of keeping up this record has been pushed vigorously and Superintendent Lanham of the Parking department reports that 2,600 trees were planted on the streets during the past year. Elms, maples, lindens and oaks are the kinds usually set out and these cost when on the street, boxed, staked and strapped, \$3 per tree. Much trouble arose from the caterpillars, but the pests were vigorously attacked and subdued. The elm tree beetles did not appear to bother the department. During the last part of the year the web-caterpillars again appeared but were quickly routed. Tree trimming is regarded by Superintendent Lanham as most important and a generous appropriation should always be provided for this work if the standard of excellence is to be maintained. The expenses of the department, including the planting of trees and extermination of caterpillars, were \$26,773. For the ensuing year the sum of \$41,000 is asked as necessary for doing the work of the department. Of this \$5,000 is for placing wire nettings around trees to protect them from horses, an evil that is on the increase and which has resulted in the death of many fine trees. The Superintendent hopes to plant about 4,000 trees.

FOR A SMOKELESS CITY.—The Municipal Assembly at St. Louis, Mo., has passed an ordinance for the prevention of smoke. It reads as follows: The emission or discharge into open air of dense smoke within the corporate limits of St. Louis is hereby declared to be a public nuisance. The owners, lessees, occupants, managers or agents of any steamboat, tug, or other water craft, or locomotive engine from which dense smoke is emitted or discharged within the corporate limits of St. Louis to the damage, injury, annoyance or detriment of any portion of the inhabitants of said city, or to the damage, injury, annoyance or detriment of any person or persons within said city, or to the damage, injury or detriment of any property within said city, shall be guilty of a misdemeanor and upon conviction thereof in any court of competent jurisdiction shall pay a fine of not less than \$25 nor more than \$100. And each and every day whereon such smoke shall be emitted or discharged shall constitute a separate offense; provided, however, that in any suit or proceeding under this ordinance, it shall be a good defense if the person charged with the violation thereof shall show to the satisfaction of the jury that there is no known practicable appliance, device, means or method by application of which to his steamboat, tug or other water craft or locomotive engine, the emission of the dense smoke complained of in the proceeding could have been prevented.

NEW WATER SUPPLY FOR JERUSALEM.—According to consular reports from Jerusalem the most noteworthy undertaking during the past year has been the installation of a water supply for the city. The water is brought in iron pipes from a spring situated about seven miles distant and known in King Solomon's time as "The Sealed Fountain." Heretofore the water supply has been very uncertain and lately a water famine was only prevented by the assistance of the railroad company. Municipal authorities, realizing the necessity of guarding against an emergency of this character in future, obtained permission to use some of the revenues of the "Evkaf," or religious endowments, for the purpose of securing a water supply for the city. This sum amounted to several thousand dollars. A commission was formed of the local officials to undertake the work and an engineer was sent from Constantinople to supervise it. While the greater part of the seven miles was laid with four-inch iron pipes it was possible to use a portion of the old stone aqueduct, known as "Solomon's Aqueduct," for carrying the water. The pipe was supplied by a local German contractor at 43½ cents per foot. Two public fountains have been erected, one inside and the other outside the city walls. Notwithstanding the expectation that the water supply would be all that was necessary the size of the city will require that considerable additions be made to the supply in the near future.

Municipal Baths in Cologne

The city of Cologne, Germany, has a population of 384,000 and owns and operates three bathing establishments. One of these, the Hohenstaufen, was opened in 1890 at a cost of \$166,600. Another, the Achter street bath, was started in 1897 at a cost of \$35,700, and still the third, the Fleischmenger-gasse bath, was opened the first part of this year, costing \$78,500. For the first of these baths the rates are as follows: Tub bath, 28.5 cents; first-class bath, 19 cents; second-class bath, 9.5 cents; first class douche bath, 9.5 cents; second-class douche bath, 4.7 cents; first-class plunge and swimming bath, 9.5 cents; second-class plunge and swimming bath 4.7 cents.

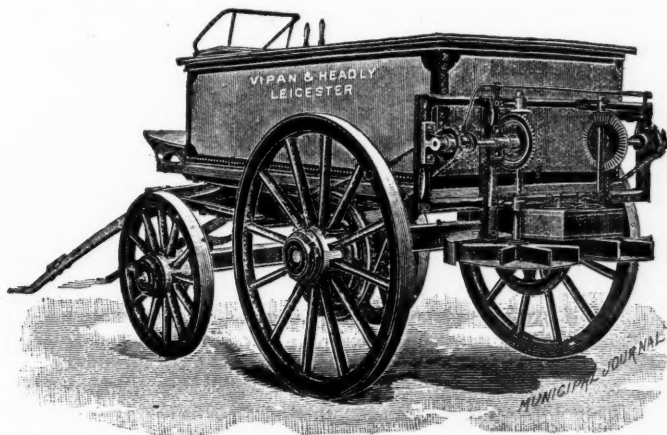
The rates at the Achter street bath are considerably lower than those at the Hohenstaufen, first-class tub baths being had for 9.5 cents and second-class tub baths for 5.9, while first-class douche baths cost 4.7, and second-class ditto, 2 cents.

A reduced price is made for all who purchase ten first-class plunge and swimming bath tickets. These may be had for 71 cents. On the Rhine there are bathing houses which are free, and others in which a charge is made of two cents for adults and half price for children.

On the whole the city's investment has proved profitable, the total profit in 1900 having been \$5,558. The Hohenstaufen establishment is constructed of red sandstone and brick, and contains beside the tub baths, Turkish baths, electric baths, swimming, douche baths, ladies' waiting room, barber shop, etc. It is open in winter from eight in the morning to eight in the evening, and in summer from six a. m. to 8.30 p. m. For the year 1900 the average number of baths per day amounted to 1,196.

An English Sprinkling Cart

"The Street Water Van," as it is called by one of our foreign exchanges, shown in the accompanying illustration, is an improved type recently placed on the market by an English firm. The one shown here is one of the best ever used in English cities. It is simple in design and construction and one which recommends itself to local authorities who do not care about complicated appliances that are apt to get out of order. The body is of wrought iron, with a central baffle plate, and is so shaped as to give the greatest head of water above the outlet valves, which have been very carefully ar-



"THE STREET WATER VAN"

ranged to insure most effective action, combined with simplicity and non-liability to get out of order and to render them easily accessible. The distributors are entirely of wrought iron and can be readily taken to pieces for cleaning. They, as well as the valves, are double, so that either one or both can be used at pleasure. The valve levers and chains are worked by the driver's feet in front. The springs on which the van is mounted are of the best quality of steel and the axles patent, with brass caps. The van is fitted with a driver's seat and shafts, and the average width of the spread of water from the distributors is twenty feet. The van can be fitted with a rotary spreader, if desired, and there seems no reason why it should not be mounted on a motor car where steam traction has been adopted for municipal purposes.

Daily Reports from White Wings

ONE of the improvements that has been introduced into the Street Cleaning Department of Detroit, Mich., is a system of daily reports from the men to Superintendent B. F. Emery, of that department. The idea originated with Commissioner of Public Works D. W. H. Moreland, of Detroit, and has proven a great success from the start. The accompanying cut shows the form that the men are required to fill out and hand in when they receive their pay. By means of this system it is possible for Superintendent Emery to tell what each man is doing and how many loads of refuse he gathers each day and, incidentally, whether he is wasting much of his time, for, when a certain average of refuse is picked up in a certain district for some time, any falling off in this is apt to indicate that a man is relaxing in his work.

The first report, after the introduction of the system, showed that there were seventy-seven men employed and that they averaged four cart loads a day each. As the carts hold about 250 pounds, the total amount picked up during the week aggregated 446,000 pounds of refuse or 223 tons. The system is a good one and is another step forward of that excellent department.

Department of Public Works, D. W. H. MORELAND, COMMISSIONER. REPORT SUPT. STREET CLEANING

No. _____

.....Street

From to

Week ending

Each week you will receive one of these cards, to be returned when you receive your pay. Fill it out each day with number of loads you pick up.

| | | |
|-----------------|--|--|
| Thursday..... | | |
| Friday | | |
| Saturday | | |
| Sunday..... | | |
| Monday | | |
| Tuesday | | |
| Wednesday | | |
| Total | | |

Keeping Washington Clean

How economically the streets of Washington, D. C., are kept clean is shown in the report of Mr. Warner Stutler, Superintendent of the Street Cleaning Department, from which the following facts are taken. At the beginning of 1901, 130 sweeping machines were hired at \$6.25 per month each, with the understanding that they were to be kept in good repair during the year and that they should become the property of the city after one year's service. Previous to the use of these machines 210 men with hand brooms cleaned a daily area of 1,565,800 square yards, or 413,765,028 square yards per year and at a cost of \$76,429.47. The same force using the machines cleaned a total of 515,992,920 square yards during the year at a cost of \$79,704.46. Thus for the extra expense of \$3,264.99 with the machines, an area of 102,227,892 square yards were cleaned in addition to the area previously gone over with hand brooms. Calculated on the basis of sweeping by hand this extra area would cost \$18,912. Based on a thousand square yards the cost during the previous year was 18.6 cents while during the last year only 15.8 cents were paid, including the wear and tear on the machines, estimated at one-fifth of their cost.

The work of cleaning the alleys during the year was performed under a contract at 32½ cents per thousand square yards. These alleys are cleaned once a week, the schedule for each day being made at the beginning of the year. The total yearly area of 39,290,597 square yards was cleaned at a cost of \$12,259.29. During the year about 14 miles of unpaved streets were sprinkled daily for 131 days at a cost of \$3,150.27.

The total amount of garbage collected during the year amounted to 30,299 tons, or 10,299 tons on which reduction was made at the rate of 50 cents per ton. This gave to the district with the fines, a total of \$5,686.50 to be deducted from the contract rate, leaving a balance of \$46,069 to be paid to the contractor. A big saving was made in this department as the collection for the previous year cost \$10,939 more and this year, in place of the former weekly collection,

semi-weekly collections were made, and in some sections three collections were made a week. Regarding the collection of ashes, the amount of 67,332 cubic yards were collected at the contract price of \$29,979.

Supt. Stutler recommends that all per diem officials be placed on yearly salaries. He also asks for the sum of \$20,000 for flushing the streets. He considers that there is no method for thoroughly cleaning the streets so good as flushing with water.

Bituminous Macadam in Worcester

THERE has just been completed on Main street, in Worcester, Mass., one of the best granite block pavements that can be laid. While its durability is not questioned, the question of its desirability is in dispute because of the price, noise, great dustiness and unsanitary features. In strong contrast to this pavement is a stretch of bituminous macadam lately laid on two of the streets of the city. This pavement seems to have the durable quality of granite, while the other objectionable features are wanting. It is not noisy, is sanitary, without dust. It is almost as smooth as asphalt, without the slipperiness of that pavement, and it was laid at a reasonable cost. Before putting down this pavement the city officials including the Mayor, Superintendent of Streets, and City Engineer, made a thorough investigation in other cities where this pavement was laid. Not only did they interview other city officials and members of the fire department, but even asked the opinion of teamsters, who, from practical experience, can tell how their horses like any kind of pavement, and what effect it has upon them. The unanimous testimony of these men, as well as of the officials, was that the bituminous macadam was pleasant to drive over, afforded a safe foothold for horses and was easy of traction. Bituminous macadam, which is often referred to as "common sense" pavement, combines the best qualities of macadam and asphalt, while it avoids the serious objections to both of these pavements, such as the slipperiness and liability to disintegrate of the asphalt, and the dust and rapidity of wear of the macadam. Worcester is not the only city that has tried this pavement and found it not wanting, but eleven of the Massachusetts cities and cities and towns in many other states are realizing its value and rapidly introducing it.

League of Georgia Cities Formed

THE League of Georgia Municipalities was formed at Atlanta on October 14th by a number of the prominent mayors of the State. Mayor Livingston Mims of Atlanta was prime mover in this work, and as a reward for his zeal, the association elected him a life member without dues. The dues for membership in the League was first placed at one dollar for each two thousand inhabitants of any city, but the final decision was made in favor of one dollar per thousand inhabitants, with a maximum of twenty-five dollars and a minimum of two dollars. The annual meeting of the League will be held on the second Wednesday of October each year. The officers for the ensuing year were elected as follows: President, Bridges Smith of Macon; first vice-president, L. H. Chappell, Columbus; second vice-president, J. T. Rhodes, Athens; third vice-president, P. H. Lovejoy, Americus; fourth vice-president, John B. Felder, of Americus; secretary, D. J. Bailey, of Griffin; treasurer, W. B. Hollingsworth, of Fayetteville.

Mr. J. K. Orr, President of the Atlanta Chamber of Commerce, made an address of welcome to the assemblage, and other prominent gentlemen of the State spoke. Mayor Mims was the temporary presiding officer until a permanent president was elected. President Smith, after election, appointed the following standing committees: Street Paving, Street Lighting, Sewerage, Water Supply, Taxation, City Legislation, Disposal of Garbage and Street Cleaning, Municipal Franchises. Little practical business was done on account of its being the first meeting of the League, but a discussion was indulged in by several of the mayors concerning the best methods of improving sanitation in small towns. Before the next meeting the members will be assigned topics which will be presented and discussions had.

Artificial Stone from Clinkers

THE Bermondsey Borough Council, London, has been the recipient of a report presented by the electric light committee regarding the utilization of clinker from the refuse destructors. The reports state that the quantity of clinker will amount to about fifteen tons per day and of this quantity seven tons will be sufficiently hard to convert, with a mixture of cement, into such articles as flags, bricks, paving blocks, etc. The finer material may be made into mortar. Experiments in other towns which have destructors, such as Liverpool, Bristol, etc., shows that this clinker can be made into flags for street paving and that the life of it is equal to that of some carboniferous stone.

The plant necessary for the handling of the clinker consists of a hydraulic press, pumps, mixing machine, moulds, etc. The stone crusher of the Council can be used to reduce the clinker to the proper size. Only four men would be necessary to take charge of the plant and each flag would receive a pressure of one thousand pounds to the square inch, and allowed to season for six months before being used. The estimated cost of the plant, complete, would be \$8,000. As the estimated quantity of flags used every year amounts to 60,000 square feet, this amount could be supplied by a little over a ton per day of the seven tons of clinker. The cost per flag would amount to about two shillings per square yard, and as compared with the current prices for artificial and other flags of different kinds, the clinker flag would cost less than half the price of the cheapest artificial flag.

Nashville and Street Railway Agree

AFTER three years of litigation in the courts of Tennessee, the difficulties between the city of Nashville and the street railway company have been settled. While neither side gained all that was asked, the compromise that has been effected leaves both in a position to claim the victory. The city will be presented with Centennial Park, valued at \$125,000, and the Park Commission will receive an annual sum equal to 2 per cent. of the gross earnings of the company for maintaining all the parks. After this sum reaches \$1,000,000, 3 per cent. will be paid. It will be paid in lieu of privilege taxes by the railroad company. The city will also have the right to purchase the property after twenty years. The company will pave the streets between the rails and two feet on the outside; will extend its transfer system and expend \$1,000,000 in improvements.

The story of the litigation is a complex one, but the main contest was over the right of the company to retain its charter after all the street railways had been consolidated. Other suits were brought but these were later consolidated and carried to the highest court, where it was declared that, while the consolidation was void, it did not work the forfeiture of the right of the consolidated company to use the Nashville streets. The company was thrown into bankruptcy and the receivers appointed managed the road so successfully that it was possible for it to agree to the terms given above.

Mayor Head, while desirous of securing everything contended for by the city, agreed to the compromise because the City Attorney and other lawyers, advised it, and because, as a lawyer, he knew that all law suits were uncertain and realized the general disinclination of courts to enforce forfeitures. Another reason for his acceptance was that the city did not have to pay any legal fees throughout the litigation, the company standing all the expense.

Massachusetts' Good Roads Field Day

THE annual field day of the Connecticut Valley Highway Association was held at Holyoke, Mass., on October 9th. It was a most successful meeting. Mayor Chapin and the officials and members of the Business Men's Association welcomed the visitors, among whom were U. S. Senator O. H. Platt of Connecticut, Mayors D. W. Brattles of Brockton and Ignatius A. Sullivan of Hartford, John B. Manning of the State Highway Commission and Street Commissioner Charles L. Frisbie of New Britain.

In his address of welcome, Mayor Chapin dwelt on the importance of good roads and gave as an excuse for the poor highway between his city and Northampton the reason that, if a good road connected

the cities, there would be an exodus to Holyoke because of its superiority.

Congressman Lawrence spoke next and stated among other things, that nothing better could be done to make this country the superior of every other on earth than the construction of good roads. President M. H. Whitcomb of the Business Men's Association, who acted as toast master, then surrendered the chair to Col. W. L. Dickinson, president of the association, whose address was interrupted with frequent expressions of approval. He said in part:

"It is generally conceded that you can judge the character of a city or town by its roads. So thoroughly is the fact appreciated, that all progressive towns and cities are expending large sums of money to improve their highways. They consider it a good business investment, as good roads are a great inducement for people to locate in a city or town that has them. This great reform, which was started in the States of New Jersey, Massachusetts and Connecticut, is now spreading over the entire country. The people at large understand the great value of good roads and are devising ways and means to secure them. The press of the country have supported this 'good roads' movement and it is only fair to state that, through their persistent and intelligent presentation to the public of facts in favor of good roads, this great reform is being carried throughout the length and breadth of this country.

"There are many perplexing conditions existing in different states. In some states their Constitution prevents the appropriation of a single dollar toward State aid for good roads. By persistent effort on the part of the 'good roads' advocates, the citizens of a few States are considering the advisability of amending their constitution to admit of an appropriation for State aid for good roads. The State of Michigan is the farthest advanced on submitting this question to the people."

Col. Dickinson went on to say that the railway officials of the South and West deserved great praise for the way in which they had favored the cause of good roads by equipping trains for the purpose of building sections of roads to serve as models. He told of the work of the National Government in the early days of the Republic in appropriating money for the building of highways and made special mention of the Cumberland road reaching from Cumberland, Md., to St. Louis, Mo., 700 miles long, costing \$10,000 a mile and passing through the capital cities of Ohio, Indiana and Illinois.

He said further, that millions of dollars are annually expended by Congress for improving the rivers and harbors when the highways are just as important. The great benefit of good highways is shown in Europe and Col. Dickinson stated that "the time is not far distant when the United States will have one of the most perfect systems of highways in the world. This can be accomplished only by the hearty co-operation of the different interests involved."

Senator Platt received a most cordial welcome. He said that there were two essentials for the progress of the people—education and good roads. He quoted two passages from the Bible which he claimed referred to the question of good roads. "Highways are wastes, and the wayfarer ceases to come," and "Go through the gates and prepare a highway for the people." The latter quotation, he said, distinctly directed the city people to go out in the country and assist in building good roads.

Other speakers were A. M. Lyman, Rev. P. J. Harkins, Mayor Brattles of Brocton, Mayor Sullivan of Hartford, Pres. Driscoll of the Massachusetts Highway Association and Mr. J. M. Wright of the Warren Brothers Company. The central thought of all was the importance of good roads to the community.

Convention of Street Railway Men

THE twenty-first annual meeting of the American Street Railway Association was held at Detroit, Michigan, October 8, 9 and 10. President Vreeland, after opening the session, introduced Mayor William C. Maybury, of Detroit, who extended to the delegates the hearty welcome of Detroit. President Vreeland thanked the Mayor on behalf of the members of the association for his hearty greeting and then delivered the president's address, in which he pointed out the injustice which is often done corporations by municipalities. He also stated that the name "American Street Railway Association"

should be changed because of the broader field of electric railroading in which many of its members were engaged.

Reports of the Executive Committee and of the Secretary and Treasurer were then submitted, and the latter report showed that there was a balance of \$9,948.03 in the treasury. The Committee on Memorials then submitted its report from which it was learned that five members of the association had passed away since the last meeting.

The first paper was that on "Registration of Transfers" by Mr. C. D. Meneely, Secretary and Treasurer of the Brooklyn Heights Railroad. Mr. H. A. Robinson, of New York, read the paper in the absence of Mr. Meneely. This paper elicited considerable discussion because of some of the unique points made by the author. Mr. Meneely claimed that his railroad was the first to introduce the daily dated transfer ticket, which has been widely adopted, and he also said that were it not for the laws against lottery, he would advocate a plan involving the issue of a transfer only for a cash fare. If a money value were given to this transfer all passengers would be willing to receive this transfer whether they desired to use it or not. This would prove a check upon the conductor, for he would have to show a stub from his transfer pad for every cash fare.

At the second session a paper on "The Street Railway Mutual Benefit Association" was read by Mr. Oren Root of New York City. Mr. Root explained the benefits of the association in his company and paid especial attention to the pension system that has been lately introduced by the Metropolitan Railway, showing how, after a service of twenty-five to thirty-five years, all employees are retired on from twenty-five to forty per cent. of their annual average wages. This means that each man under these conditions has held in reserve for him by the company the sum of \$10,000 from the time he retires until the time of his death.

All the papers for this convention were printed previously and distributed to the members so that at no time was the whole paper read, only certain points being brought out by the author, and thus more time was given for extended discussion. The full paper by Mr. Root concerning the Mutual Benefit Association showed that the association guarantees to its members: (1) In case of sickness the payment of one dollar a day for a period not exceeding ninety days within a year; (2) the payment of three hundred dollars at death; (3) free service of a physician; (4) the use of reading and pool rooms, for which one cent per cue is charged; free monthly lectures and entertainments and eligibility for pension. There is no expense attached to the association except for the salary of the physician and while the assessments for sickness and death do not average fifty cents per month per man, that sum is deducted from his wages so that a surplus will always be had. Other members gave their views about this and the benefit associations in their own companies. Another paper presented was "Electric Express and Package Delivery," by George W. Parker, General Express Agent, Detroit United Railway.

On the last day the Committee on Standard Rules presented its report which was adopted. Extracts from papers on "The Steam Turbine," by Mr. E. H. Sniffin, and "The Adjustment of Damage Claims," by Mr. Starring, were read. Mr. W. A. Satterly, Superintendent Kansas City Metropolitan Railway, presented a paper on "Discipline of Employees by the Merit System," in which he pointed out the great advantage of the system of his company by which merits and demerits were marked against men's names according as they deserved them. The list of violations of rules for which demerits are given and all acts for which merit marks are assigned are posted so that each man will know what is the penalty, or reward, for any act.

Another paper was on "Signals for Urban and Interurban Railways," by George W. Palmer, Jr.

The Committee on Nominations made its report, and on motion the Secretary cast the ballot of the association for the names mentioned. The following were elected: President, J. C. Hutchins, President Detroit United Railway; first vice-president, W. Caryl Ely, Buffalo; second vice-president, W. K. Schoeff, Cincinnati; third vice-president, P. S. Arkwright, Atlanta; secretary and treasurer, T. C. Pennington, Chicago. Executive Committee: H. H. Vreeland, New York; R. T. Laffin, Worcester; Andrew Radel, Bridgeport; W. P. Read, Salt Lake City, and W. J. Hield, Minneapolis.

WHY AMERICAN GARBAGE CREMATORIES FAIL

THE question of garbage disposal in the United States, as elsewhere, is a vital one, but thus far the efforts to meet it, have not, in this country, been rewarded with any great success. In England and on the Continent, the problem has been almost completely solved and there is no reason why the cities on this side should not do likewise.

The city of Trenton, N. J., has a garbage crematory, of which many complaints have been made, because of the odor and the amount of refuse that has come from the chimney and been blown over the immediate neighborhood. Rudolph Hering, of the firm of Hering & Fuller, New York City, was asked to investigate the situation and suggest some means of correcting the evils. He found that the city's refuse was separated into ashes and non-combustible material, which was used for filling in purposes; the garbage proper or house refuse, which, during the summer is almost saturated with water, and which is collected and delivered to the crematory, and thirdly, the refuse from stores, much of which is of a very combustible nature, such as paper, boxes, etc.

No trouble was apparent because of the manner of collection and disposal of the first-named class, but of the others serious complaint was made. The house garbage is collected in iron carts of up-to-date pattern, and they are water tight and sanitary in every way, so that no offence has been given by them. When the wagons arrive at the crematory the garbage is dumped immediately into the furnaces, and this is one of the reasons Mr. Hering assigns for the non-success of the crematory. Offensive odors arise when the ashes are removed from the grates, and this was found to be due to the fact that the garbage had not been thoroughly burned. Mr. Hering maintains that if the furnaces were capable of burning the organic matter, and if the attendant were an intelligent man, this trouble would not arise. He strikes a key note when he says that any stoker or fireman who is familiar with the handling of coal fires is considered competent to take charge of a garbage furnace. This mistake is frequently made in the United States, but it does not occur often on the other side of the Atlantic.

Regarding the dust which escapes from the stack of the furnace, he finds that much of the trouble is exaggerated, but suggests that if the flues and dust chambers were properly designed, and if proper dampers were placed in the flues so that when the furnace doors were opened for renewing the fuel, these dampers could be closed to prevent too great draft, all this dust would settle in the dust chambers and only the gases escape from the stack. Mr. Hering suggests the size necessary of dust chambers for this particular plant and also the character of the dampers to be used in the flues; but the principle is the same for any kind of garbage burners. To illustrate his contention that an intelligent stoker should be employed to care for the furnace, he states that during his investigation the damper that had already been placed in the flue was not operated when the furnaces were fed, and the consequence was that the great draft due to the open furnace door caused much of the lighter material to be blown up the flue before it could be burned. The dampers, he suggests, should be so constructed that, when the furnace doors are opened, they can be closed so that the amount of draft would be equal to the normal draft when the doors were shut tight.

One of the great objections to the garbage furnace was the stench due to the incomplete combustion, and this is a question that has not yet been solved in this country. Taking into consideration the character of the garbage that is collected in Trenton, and comparing it with the garbage of European cities, Mr. Hering reaches the conclusion that conditions are about the same, despite many statements to the contrary. In Europe, garbage and city rubbish are mixed with the ashes which makes the whole comparatively dry. The unburned coal in the ashes, together with the combustible matter of the rubbish itself, has been found to be nearly sufficient to burn the other matter. In Trenton it has been the practice to use coal to dry and burn the garbage, but even in this respect Mr. Hering thinks that the 2.3 tons of coal used per day is entirely excessive. To the construction of the furnace, he thinks, is largely due the excessive con-

sumption of coal. To remedy this the reconstruction of important points of the furnace is necessary. Instead of the flat grate should be used the sloping grate, common to European crematories. The Trenton crematory has an evaporating pan underneath the drying grate, into which the water drops during the process of drying the garbage. In Europe, before the garbage is fed to the furnace it is allowed to stand, either in carts or in a bin, and the excess of water runs into the sewer. When the garbage is fed the crematory, consequently, it is thoroughly dry. In Trenton, on the other hand, the garbage is immediately dumped on to the drying grate, and much of the heat is consumed in forcing out the water which would otherwise run off if the opportunity were given it. In Europe the garbage and refuse are, after allowing the water to drain away, placed upon the drying grate, and from there almost automatically pushed down the inclined plane to the fire which is hottest at the beginning. When the gases leave the furnace they are forced to pass over this fire again before going to the stack. On the way they pass over auxiliary fires which consume the inflammable gases, and the dust chambers are large enough to allow the particles of dust to settle before the gas goes up the chimney.

Instead of dumping all the refuse and ashes in one pile, as would be done in Trenton if the ashes were mixed with the garbage, in Europe the ashes and combustible matter are kept separate and used to mix with the damp garbage whenever it is necessary to increase its combustibility. This is a point which is very important as regards the reduction of the amount of coal necessary for combustion. Thus it has been found in Europe that little, if any, coal is necessary to aid combustion. Applying this to Trenton's case, in which about 80 per cent. of the garbage is moisture, and allowing one pound of coal to evaporate ten pounds of water, 2.4 tons of coal would be necessary to evaporate the entire quantity of moisture, but of the 20 per cent. solid matter of the garbage about 90 per cent. is combustible, and a conservative calorific value of this dry material places it equal to one-third that of coal, or the six tons of dry material will take the place of two tons of coal. Subtracting this from the 2.4 tons of coal necessary to evaporate the water, but .4 of a ton of coal is needed daily for the consumption of garbage.

Returning again to the construction of the garbage furnace, Mr. Hering points out the fallacy of using a horizontal grate on which the garbage is dumped here and there, and which partially extinguishes the fire below.

Details of flue construction and dust chambers are also taken up and he submits a couple of valuable tables showing the percentage composition of garbage in the United States and European cities, exclusive of the ashes, coal and non-combustible rubbish, and a table showing the results of the operation of the garbage crematory at Trenton for a week. Mr. Hering says that in the case of Trenton when the garbage is delivered at the crematory rapidly and not in the best order for firing, it should be stored. This storage can be in the carts themselves, or on the floor near the feed holes, as is done in all crematories abroad, and there is no necessity for any complaint from such storage because the garbage does not remain here long enough for putrefaction.

Among the minor suggestions are the careful attention which should be given to the auxiliary fires so that they burn briskly at times when the conditions for the escape of malodorous fumes are most favorable. All ash pits, flues, dust chambers, etc., should be frequently inspected and cleaned so as not to allow any deposits to reduce their size. He emphasizes again the importance of not undervaluing the necessity of having operators with a good practical knowledge of firing such a complex material as garbage.

One other important point made by Mr. Hering is that the crematory is overworked and that the amount of garbage burned in Trenton per equivalent of the English cell area is 14 tons, while in Europe it ranges from 6 to 7 tons. If the Trenton crematory were operated twenty-four instead of twelve hours, or if its capacity were doubled, the difficulty arising from over working would be obviated.

DIGEST OF CONNECTICUT SEWERAGE REPORT

WERE the sewage of cities exactly alike in make-up, the question of its disposal would be a comparatively simple one, but hardly two cities are similar in this respect and it is necessary to experiment extensively with the sewage of a city before the best methods of dealing with it can be determined. It was with this purpose in view that Prof. Leonard P. Kinnicutt of the Worcester Polytechnic Institute and Mr. Harrison P. Eddy, superintendent of sewers at Worcester, Mass., carried on the experiments, the general outline and results of which are given in the following summary of their report:

The general action of the septic tank on crude sewage is the breaking down of complex organic compounds into simpler substances in order that the sewage may be more easily purified by sand bed treatment. It is a way of aiding the bacteria in the intermittent filtration process, etc. The breaking down is due directly or indirectly to the action of the anaerobic bacteria. Part of the suspended matter is brought into solution and the organic matter is changed into its constituent parts. The action of the septic tank is two-fold, preparing the sewage to be acted on easily by the bacteria and removing, in the form of gas, a portion of the organic matter. The usual method of determining the amount of the changes taking place in the septic tank and the amount of organic matter removed from the sewage has been by examining the crude sewage and effluent.

The study of the gas evolved and the deposit formed is of great importance. The amount and composition of the gas gives a better idea of the energy of the bacteria than can be determined by the examination of the sewage and effluent. In studying the action of the septic tank on the iron acid sewage of Worcester, the amount of solid matter and nitrogen in the form of free and albuminoid ammonia in the sewage and effluent was determined as well as character of the deposit and crust in the tank and the composition and amount of the gas evolved.

The main difference between the sewage of Worcester and that of other cities is the amount of copperas and free acid it contains and the conclusions that are given later apply to that character of sewage only. For a period of fifteen months the experiments were carried on at Worcester and it was found that the average amount of solids entering the tank was 74.6 parts in 100,000, or 43.69 grains per gallon, while the average amount in the effluent was 58 parts, or 33.97 grains per gallon. The substances in solution in the sewage averaged 29.6 grains per gallon and in the effluent 23.48, showing a removal of 20.67 per cent. In the sewage there were 14.09 grains per gallon of suspended matter, 25.57 per cent. of which was arrested in passing through the tank. It was found that the percentage of suspended matter arrested does not seem to depend on the amount of suspended matter in the sewage, but is affected by the temperature, being greater in the cold months. The large amounts of iron sulphate in the Worcester sewage accounts for the greater amount of soluble matter being removed from it than from sewage of other places.

The percentage of suspended matter is not as great as that removed in other sewage. The assumption that the difference in the amount of solids in the sewage and effluent is due to liquefaction and decomposition of the suspended matter is not so. Changes take place with both the soluble and the suspended matter and the amount of solid removed is the resultant of these two actions. In some cases some of the solids are rendered insoluble by septic action and some of the solid matter in solution is decomposed with the evolution of gas. There was always an amount of iron removed from the sewage in the case of Worcester and these amounts varied from 25 to 50 per cent., and the amount of iron in solution in the effluent was always much less than the amount in solution in the sewage. It was practically all in the form of sulphate while the iron in suspension in the sewage was not united to sulphur. The iron in suspension in the effluent was nearly all in the form of sulphide. These results show that a large amount of the iron sulphate is reduced to iron sulphide as the sewage passes through the tank, that a part of the iron sulphide is precipitated in the tank, and a part passes off in the effluent as suspended matter.

Such results are to be expected with acid iron sewage and a larger amount of undecomposable sludge than in domestic sewage. The

effluent, containing more or less iron sulphide, will clog the bacterial beds and affect their action because of the changes the iron sulphide when on the dry surfaces of the beds, free iron oxide and sulphur being formed.

The condition of the sewage on entering the tank accounts for the difference in the amount of free ammonia in the effluent found by different persons. Worcester results showed an increase of 20 per cent. The difference in albuminoid ammonia in the sewage and effluent usually shows the amount of organic matter removed. The stronger the sewage the greater the percentage of organic matter destroyed and this is increased by the increase in temperature of the sewage. Judging from the albuminoid ammonia, the average amount of the organic matter removed during the tests at Worcester was 26 per cent. This low percentage is partly due to the fact that the sewage contains less organic matter than average sewage, but it is principally due to the acid character of the Worcester sewage and, consequently, a less degree of purification can be obtained by means of septic action in sewage from manufacturing wastes than from domestic sewage.

The amount of gas produced does not seem to be in any direct ratio to the amount of albuminoid ammonia removed. By means of a gas meter attached to the septic tank, the amount of gas given off per hundred gallons was 2.32 gallons. The amount of gas depends greatly on the temperature and the amount of sludge decomposed is much greater in the warm than in the cold months. The amount of carbon dioxide ranged from 2 to 22 per cent. and the quantity of hydrogen was always under 4 per cent.

At Worcester the amount of sludge from matter arrested in the passage through the tank was destroyed in an amount equal to 28 per cent. This small amount is due to the fact that the sludge contains a large amount of iron sulphide and shows that, in iron acid sewage, it will be necessary to clean out the tank more frequently than with domestic sewage. At the end of May the composition of the sludge showed a greater amount of organic matter than at the end of the summer. Contrary to the general opinion, the formation of a crust on the surface of the tank is not a necessary but an incident to the liquifying of the solids and septic action went on irrespective of the crust.

The general conclusions drawn from the experiments were given as follows in the report:

One-fourth of the total matter is removed by the passage of the sewage through the septic tank. The amount of soluble matter removed, being 21 per cent. of the total soluble matter in the Worcester sewage, is greater than the amount usually removed by septic action. The amount of suspended matter removed, being 25 per cent. of the total at Worcester, is much less than the amount taken from sewage not having manufacturing wastes. These results are due to the change of the soluble sulphate of iron into the insoluble sulphide of iron and because a large amount of iron sulphide is carried out in the effluent.

The action of a septic tank removes a large amount of iron from an iron acid sewage. The amount of organic matter removed, being in Worcester, 26 per cent., is much less than that removed from an alkaline sewage. While a greater amount of organic matter is removed in the warm months, no direct relationship between the temperature and the organic matter is shown thereby. The amount of gas given off depends on the amount and character of the sludge and is a measure of the total amount of bacterial action but not of the amount of organic matter being removed. The amount of gas is also dependent on the temperature and is less in winter. The amount of gas from the Worcester sewage is less than from sewage containing more organic matter. The gas from the acid iron sewage is a mixture of methane, nitrogen and carbon dioxide and there is little hydrogen.

The amount of sludge changed into soluble or gaseous substances, 28 per cent. in Worcester, is less than usual on account of the iron sulphide in the sludge. The sludge contains less organic matter in the autumn than in the spring. The crust contains much more organic matter than the sludge. The formation of the crust or its absence is but an incident of bacterial action.

MUNICIPAL ELECTRICIANS MEET

Successful Meeting at Richmond—Governor Makes Address—Interesting Papers Read—The Telephone and Signal Systems—Delegates Royally Entertained

THE seventh annual convention of the International Association of Municipal Electricians assembled at Richmond, Va., October 7-9, to discuss electrical problems. After the session was opened with prayer, Governor Montague delivered an address of welcome in behalf of the State. Mayor Richard M. Taylor then extended the welcome of the city of Richmond. President Austin S. Hatch of the Association then introduced Captain William Brophy of Boston, Mass., who responded to the speeches of the Governor and Mayor.

President Hatch followed Captain Brophy and delivered his annual address, which was given the greatest attention on the part of the delegates. Mr. Walter M. Petty, Superintendent of Fire Alarm of Rutherford, N. J., read an interesting paper on "Municipal Inspection and Control of Electrical Matters." Mr. Petty took up the subjects of "overhead construction," "subways," "interior wiring," and "licensing of electrical workers." A lively discussion was started on the various points touched upon by the author. The discussion was carried over into the next session. Mr. Cleon Williams of Meridian, Miss., during the course of the discussion read a set of rules governing his electrical department which he declared to be the best in the country.

President Hatch delivered a paper on "Electrical Government" and this elicited a similar discussion to that attending Mr. Petty's paper. While the afternoon session was in progress, the ladies were treated to a drive around Richmond and the points of interest pointed out. In the evening a theatre party of the delegates and ladies was given at the Bijou where they were the guests of the local committee on entertainment.

The morning of the second day of the convention was devoted to a business session at which members of the Association read papers, exhibits were inspected and a general discussion took place. The President appointed various committees and reports of the standing committees were read. These showed that wonderful progress had been made since the organization of the Association seven years ago.

TELEPHONE AND SIGNAL SYSTEMS

A paper on the "Telephone Service in Connection with Fire and Police Signal Systems" was read by Mr. Jerry Murphy, Superintendent of the Police Patrol Service at Cleveland, O. The following summary has been made of the paper presented by Mr. Murphy:

While I do not aim to revolutionize police and fire alarm signaling apparatus, I submit this paper for the purpose of learning, through discussion among the members of the association, the many ways in which the telephone can be operated successfully in connection with police and fire alarm systems. The telephone is taking an active part in our police and fire alarm systems so that we do not question the advisability of having telephonic connection direct from the exchange to the different fire stations, etc.

Comparing the signal boxes that are on the market to-day with those of two decades ago, the improvements both in design and workmanship can be appreciated at once. Yet, in my opinion, no police box is complete without telephonic connection. In my city, records show that there are more depredations committed in the precincts in which are the old style boxes without the telephones, than in those of the improved style. The small percentage of crime in the newly equipped districts was so noticeable that it attracted the attention of all the officials and they became thoroughly convinced that all the boxes in the city should be the same style.

IN CONJUNCTION WITH POLICE TELEGRAPH

For police telegraphic departments I believe thoroughly that everything should be connected with one central office in preference to a district system, because more disciplining can be exercised in the department, and favoritism prevented between office and patrolmen when all records of calls and reports are kept by a corps of operators especially employed for that purpose. When patrolmen are required to use only a mechanical signal to report what is called "duty call" it is often the practice for one man to report for several, but with the central office plan this is avoided.

Combination police signal boxes should be so distributed that there should not be more than eight boxes on each circuit. This will prevent any interruption when two boxes are "pulled" simultaneously. The telephones should be connected in multiple and the "common battery" system should be employed. This method is the most rapid and requires less labor than with a local battery. The wires should be so arranged that an officer at any of the street boxes could connect with any station house or officer in the department. Officers should also be able to connect with any subscriber through any of the exchanges. This plan would prevent the necessity of patrolmen leaving their beats in case it is necessary to connect with any citizen.

PREVENTS ESCAPE OF CRIMINALS

The police telegraph and telephone signals should also be arranged so that they will close all avenues of escape, such as depots, boat landings and streets in close proximity to suburban car lines. Such an arrangement has enabled detectives in Cleveland to make several good catches of criminals by preventing their escape from the city.

To facilitate service, keys to the signal boxes should be distributed liberally in the neighborhood. While a great many false runs would be made by the patrol wagon, the great advantage accruing to this plan is the fact that if a citizen has a key and can thus connect with headquarters at once, almost as much authority can be wielded by the citizen as by a uniformed policeman.

Considering the extent to which the telephone has improved the efficiency of the fire alarm telegraph service it may be said that many cities and towns are entirely dependent upon the telephone for sending in fire alarms to headquarters. As is well known, this has proven very unsatisfactory, mainly because the person sending in the alarm is excited and does not use proper judgment in notifying headquarters of the position of the fire. Then, too, in the hurry, many times the operator in the exchange misunderstands the message and confusion results.

AN AID TO FIRE ALARM

However, the telephone can be made a very useful instrument if used in connection with the fire alarm telegraph.

A portable telephone set in the hands of a line man will enable him to determine the condition of the fire telegraph line. In addition each fire company in the city should be equipped with a portable telephone set, so that while at work at a fire the fire alarm wires can be used as telephone wires and instructions transmitted back and forth from headquarters to the scene of the conflagration.

It is a well known fact that police and fire departments throughout the United States are dependent entirely upon their electrical departments for success. Consequently it devolves upon every member of this association to keep his system in perfect order, so that the departments, either police or fire, will not be hampered in the least by it.

"The Joint Use of Conduits" was the caption of a paper presented by Mr. Charles F. Hopewell, S. B., of Cambridge, Mass. He spoke of the two sides of the question; the economic and engineering features. He considered the question of the requisite separation between the high and low tension wires such that perfect safety was insured and cited instances where both classes of wires were run near together with safety. He told what was the best material of which to make conduits and how they should be constructed. Some of the advantages of the joint use of conduits were the decreased cost of construction and operation and the prevention of digging up the streets.

TRIP DOWN THE JAMES

In the afternoon the delegates gathered at the wharf of the Old Dominion line where a photograph was taken of the group and then all went on board one of the line's boats for a trip down the James river to City Point. Music and a band of negro singers enlivened the trip and the points of interest were pointed out by Mr. Robert Lee Traylor, who is well informed concerning the history of Virginia. In the evening the fire alarm and police telegraph systems were in-

spected at the city hall and informal talks were given by the members and citizens. Among those who spoke were: Mr. John H. Frischkorn, president of the Board of Fire Commissioners; Mr. Charles F. Taylor, Hon. Sol. L. Bloomberg, president of the Common Council; Mr. Fred C. Mason, superintendent of the police telegraph at Brooklyn, N. Y., and President Hatch. Superintendent Thompson gave a short talk on the early history and organization of the Association. An adjournment was then taken to Mechanics' Institute, where Mr. C. F. Hopewell of Cambridge entertained the delegates with magic lantern views.

ELECTION OF OFFICERS

On October 9th, the delegates assembled for a morning session at which Captain William Brophy of Boston, Mass., delivered his paper on "Relation of Electrical Interest to Other Branches of the Municipalities." An exhibit was given of the new combination high and low fusing Montauk Fire Detecting Wire. At the afternoon session the reports of the secretary and treasurer were read and the nominating committee made its report on names for election of officers. By unanimous vote Mr. W. H. Thompson, superintendent of the fire alarm in Richmond, was elected president. Mr. Jerry Murphy of Cleveland was elected vice-president and the other officers were: A. C. Farrand, Atlantic City, N. J., second vice-president; W. A.

Barnes, Bridgeport, Conn., third vice-president; C. F. Williams, Meridian, Miss., fourth vice-president; F. B. Foster, Corning, N. Y., secretary; Adam Bosch, Newark, N. J., treasurer. Executive Committee: Walter M. Petty, Elmer G. Loomis, William Brophy, A. S. Hatch, J. B. Yeakle, F. C. Mason, W. Y. Ellett, G. F. Macdonald, and William Crane; Finance Committee: C. F. Hopewell, Charles Greenwald, Ion Simons, and C. R. Newman.

Niagara Falls, N. Y., Buffalo, N. Y., and Atlantic City, N. J., were strong competitors for the next convention, but after a good deal of discussion, Atlantic City was selected.

In the afternoon the delegates were given a trip to Lakeside, where luncheon was served and a good time had generally. A banquet and ball took up the time of the evening, and at the former some brilliant speeches were made. Mr. Marx Gunst acted as toastmaster. Mr. Fred C. Mason proposed a toast to the little daughter of President Thompson, referring to her as the daughter of the Association and all responded vigorously. President Thompson, Commissioner Frischkorn, Mr. Petty, President Bloomberg, also made speeches. Interesting talks were given by Mr. G. F. McDonald, city electrician of Ottawa, Canada, and Mr. Mason of Brooklyn, N. Y., and Captain Brophy paid a most glowing tribute to Richmond and the reception accorded the visitors.

WIRE GLASS WINDOWS

Great Need of Fire Retardants—Other Preventives in Use—Some Advantages of Wire Glass—Experience of Chief Musham of Chicago

*By Edward F. Croker**

THE subject for which I shall have the honor of asking your consideration will be Wire Glass—the fire retardant, a building material which tends to reduce to the minimum the hazard of conflagration and conduces to the elimination of some risks attending the lives of us humble fire fighters. The range of possibilities in fire protection is too wide to speak of here, if I am to be favored with your attention, and only a small portion of it can be engaged in during this short session. I shall endeavor to advance that which I believe to be the most important factor in the protection of buildings against conflagration, and I shall be amply rewarded if I enkindle in your minds an inclination to seek more information upon the subject than I am enabled to communicate.

DEMANDED BY MODERN BUILDING METHODS

It is manifest to all thoughtful minds that the phenomenal development of the real estate values in our cities has made the tall building a necessity and this necessity has brought with it the need of adopting in building construction barriers to conflagration, and there are today buildings capable of enduring without structural injury the action of fierce, long continued interior and exterior flames and the application of cold water upon their heated surfaces. Structurally a building of this class is admirable—the foundations are secure, the walls and roof fireproof, but openings in wall and roof are necessary to render it habitable. Obviously the vulnerable parts of a building are the openings in the walls and roof—its doors, windows and skylights. To these openings the spread of flame is almost wholly attributable. This has been the history of so many destructive conflagrations that experts have long agreed that no structure in a closely built city can be considered even approximately secure against fire so long as it is provided with only ordinary windows, skylights and doors. My experience and observation have been such as justify this opinion and I have most strenuously maintained that the quantity of wood contained in what I have termed "a structurally fireproof building," taking into consideration, also, the furniture and fittings, would, in

the event of fire, endanger the property and the lives contained within it.

OTHER PREVENTIVES

Shutters of iron, or of metal covered wood, may protect windows if they are carefully closed, but in practice such shutters fall short of the purpose for which they were intended. When the crisis comes the shutter is frequently found open. Under the most favorable conditions an iron shutter at a fire is not the thing that the firemen want to come in contact with. Its rusty fastenings and blistering sides are objectionable to say the least, and its reach when it swings open, is liable to knock a man off the ladder. This is a risk to which the fire fighter should not be subjected. There is no braver, manlier, or more faithful set of men in the public service or out of it than the brave lads enrolled in our Fire Department. I know of whom I speak and I am well acquainted with the chances they take. They are ready to fight with death every day. Every year sees them saving life heroically or dying in their duty. Their work is as trying, difficult and dangerous as there is in the world. Yet they are not safeguarded. I know what ready fellows they are and I feel that all known means of protection should be adopted to render their calling less hazardous.

SOME ADVANTAGES OF WIRE GLASS

Wire glass is, in my opinion, the fire stop for window and skylight openings—wire glass set in metal frames. It supplies the requisite light and ventilation as well as protection against fire; its installation obviates the necessity of the cumbersome and unsightly hinged shutters and the projecting lags and adjusters which support and secure them. It affords protection regardless of the janitor's neglect, because the thought of fire is not necessarily present in the mind of the tenant to induce him to close the window sash and when closed it prevents the ingress, egress or communication of flame. It enables the fire chief to size the situation and direct his men intelligently. The location and volume of the blaze are immediately disclosed and if the conditions warrant it the firemen can effect an opening for the stream with his fire axe.

Hard conditions, great risks, and the sacrifice of large property and many lives are preliminary to the establishment of standards, and by such means wire glass has come to be recognized as standard and the degree of honor which is its legitimate due should be generally recognized.

Succinctly stated, wire glass has yielded two fixed values as its contribution to fireproof building construction:

* Chief of Fire Department, City of New York, who read this paper before the thirtieth annual convention of the International Association of Fire Engineers, held in Grand Central Palace, New York, September 16-19, 1902. Edward F. Croker is in his nineteenth year of service in the New York Fire Department. He was appointed on June 22, 1884, at a salary of \$800, a few days before he was twenty-one. His progress has been so rapid that he is the youngest Chief in the history of the department. He was made Assistant Foreman on August 16, 1884; Foreman, February 25, 1886; Battalion Chief, January 2, 1893; Deputy Chief, July 31, 1896, and succeeded Chief Bonner on July 1, 1899. He was born in New York on June 18, 1863.—[EDITOR.]

It retards fire without hiding it—permits the blaze to declare itself. It can be cracked, but it cannot be scattered. If fractured it retains its place.

IMPORTANCE OF LOCATING FIRE IN FIRST STAGE

Now, we have to remember what we can't forget, and we are mindful, therefore, of experiences which enable us to fully appreciate the value first stated. Of the many embarrassments to which the fire fighter is subject, that which prevents fire from disclosing its location in its incipient stage is the most serious. Within the congested districts of our great cities, our organizations are such as enable us to reach the scene of action and have our nozzles in hand within two to three minutes of the alarm, and if we could immediately get at the fire, we would, in most cases, have little difficulty in confining the blaze within the limits of the apartment in which it originated.

Modern science has equipped our departments with devices necessary to combat fire, the most contagious, virulent and disastrous of all perils to which buildings are subject; and modern science has devised the means by which fire can be confined within the walls of buildings without rendering the same inaccessible to us, but the adoption of the means available is not general, and upon arriving at a fire we are frequently confronted with tin covered and iron clad shutters which obstruct our vision and our efforts to locate and conquer a blaze which becomes a conflagration because of the precious moments lost in concentrating our energies upon the seat of trouble.

WIRE GLASS DOES NOT HIDE FIRE

This condition has long been a serious menace in all cities and it is now intolerable because the installation of wire glass presents no technical difficulties. It is of acknowledged efficiency and no less economical than effective. It has withstood the severest tests and its cost is well within the means of all building owners. The insurance companies give "preferred" rates when it is installed and thus practically invest in it. Their scheme is to reduce hazards, and in the belief that wire glass effectually accomplishes this, they induce its adoption by substantial endorsement. Its ability to abate horrors and loss which attend conflagrations in cities is ample justification of the reasonable laws providing for its adoption and an exigent public is presented to Building Inspectors to prevent these laws being nullified by official inertia.

There is a region paved with good intentions, and many easy-going

owners of buildings contribute to this paving fund by deferring the adoption of known means of protection and at the same time create occasion for regret from heavy financial loss and probable loss of life. I want to see the obligation placed upon owners of buildings to prevent such losses by the means which will effectually render fire non-communicative, and I think I have specified the means. The significance and overwhelming argument in favor of wire glass as a fire stop is the fact that when fractured it retains its place and continues to retard draft and its attending flames.

CHIEF MUSHAM'S EXPERIENCE

Doubtless many of the Chiefs present have had occasion to recognize the efficiency of wire glass as a fire stop and, of the many, Chief Musham's experience is especially worthy of reference. The fire which destroyed the Armour Lard Refinery, Union Stock Yards, Chicago, on the night of May 16, threatened for a time the entire district. Chief Musham was present, and he has stated that the wire glass in the windows of the several walls prevented any communication through them and demonstrated the ability of wire glass to prevent the spread of the flame. The building destroyed was of recent construction, 100x100 feet, five stories in height and subdivided into four sections by fire walls, two of which were completely destroyed.

The quantity and nature of the material—refined lard—in combustion, resulted in the hottest kind of a fire and its intensity and duration are hardly comprehensible. The Chief tells me that the flames reached to a height of 150 feet above the roof and the combustion was so perfect that scarcely any sparks were observed.

I am quoting Chief Musham because I think, perhaps, his observation of wire glass in this instance was under a better condition than can be conceived for an actual service test of wire glass. The entire interior of the building was of inflammable construction, made more so by being saturated with lard, and its five great floors were loaded with tons of this highly combustible product. Tanks containing thousands of gallons of renderings were exploded and their contents dashed against the walls and windows and the intensity of the heat was so great that the walls holding the frames and sash which accommodated the glass crumbled, but until they fell the wire glass retained its place.

This fire establishes conclusive proof of the efficiency of wire glass as a fire retardant and its staying qualities, and for the purpose of illustrating my subject I have considered it preferable to my own experience.

THE DOG POLICE OF PARIS

For the training of the dogs of the Paris police special rules have been drawn up and restrictions laid down as to the conversation that is to be addressed to them by the agents in control. The only phrases the men are supposed to make use of to the dogs are: "Rise!" "Back!" "Here!" "Lie down!" "Silence!" "Go look!" "Carry!" "Go Home!" "Jump in!" (the water) "Lie low!" "Help!" and these seem to be all that are really necessary in the way of commands. The agents are further informed that it is forbidden to strike the dogs; at the same time they are supplied with a combination lead and whip—to be used, no doubt, as a lead for the dogs, and as a whip for other too-intruding members of the canine race. And while every kindness must be shown to them, while they must be persuaded and cajoled rather than forced and knocked into obeying commands, no little tit-bits in the way of sugar plums may be used as a persuasive influence.

Again, the official mind remembers that some \$100 apiece has been paid for the dogs, and consequently their health is worth studying, so it is furthermore laid down that on cold days, when the water is more than usually chilly, there is to be no practice with the drowning dummy, and the dogs are not to be sent unnecessarily into the river; while at any time, after one of them has taken a plunge, it must be immediately taken back to the station, rubbed down, and thoroughly dried. In no uncertain terms it is pointed out that they must not be encouraged or permitted to attack persons. This reads rather strange in view of the fact that they are essentially life-saving dogs, until it is pointed out that their duty does not end in rescuing persons

from the river, but includes the parading of the river banks in company with their masters during the dark hours of the night. This is undoubtedly the most unpleasant part of the duty of police, who have under their care thousands of pounds' worth of goods stocked on the banks of the Seine, unloaded there from barges. It attracts innumerable thieves, for whom the agents have to watch; and between them there arise often desperate fights which, notwithstanding that the police are armed with revolvers, do not always terminate in favor of right and justice. Many a policeman has been done to death in this manner, and his murderer never discovered. It is hoped that the assistance of the dogs will put an end to this lawlessness, or at least have the effect of diminishing it; for though the animals will not be inspired to attack the evil-doers when they scent them out, attract the agents by barking, there is little doubt that, should their masters be set upon, the dogs would be well to the fore in rendering a good account of themselves. The cost of the keep of the dogs is no small item, for healthy Newfoundland dogs have very good appetites; 14 cents per day has been estimated as the expenditure for their food, and meals are served hot or cold according to the state of the weather. At present there is no special accommodation for them, and they reside in the station when not on duty; but orders have already been given for the building of a large house at the side of and communicating with the station, wherein the dogs will be housed, each in its own apartment; and in addition there is being erected therein a huge copper for the cooking of their food.—*Windsor Magazine*.

ELECTROLYSIS

Its Destructive Effect on Gas and Water Pipes—Conditions Under Which It Occurs—What Remedies Should Be Taken to Prevent It

By Captain William Brophy

At the annual convention of the International Association of Fire Chiefs, Captain William Brophy, of Boston, Mass., presented a paper on the above subject and the following condensation has been made of it:

When water and gas pipes were once well laid, they could be relied upon for service for twenty or thirty years until the advent of the electric street railways. If the water pipes are of sufficient strength and size and if there are enough hydrants, engines, trucks and other fire apparatus, the fire department is ready to wage a successful fight with any fire, but if electrolysis has been at work on the water pipes, the supply may and will fail at the critical moment and the efforts of the firemen will be in vain. Failure of the gas pipes from this cause may occasion loss of life and property.

Captain Brophy took it for granted that the officers of the fire services were not familiar with electrolysis, although its destructive action has been seen by them time and again. Presuming, too, that their knowledge of electricity was very limited, he proceeded to define some of the more common electrical terms before taking up the subject of electrolysis. He stated that the volt was the unit of electrolytic pressure as is the pound in a water system, and as the water gauge indicates the pressure of that fluid, so the voltmeter shows the pressure in volts of the electrical current. He likened a dynamo attached to a telegraph line to a steam fire engine, inasmuch as it supplied the pressure of the current on the line just as the engine furnishes the water pressure. The electricity is collected from the earth by the dynamo, is pushed along the circuit and returns again to the earth. An engine takes water from a pond or reservoir, forces it through the hose line and it returns to the pond or sinks in the earth again. Both instruments only set in motion what is already at rest in the earth or on its surface. When this force is spent, in the one case the electrical level or equilibrium is restored, while in the other the hydraulic level is restored.

The ampere is the unit of electrical quantity as the gallon is the unit of the line of hose, while at the tip of the nozzle there is no pressure. At the negative or inlet point of the dynamo there is no pressure no matter what the pressure may be at the outgoing side just as in an engine there may be a large pressure at the end of the hose line, but none at the inlet or suction end.

DEFINITION OF ELECTROLYSIS

The author defines electrolysis as the "separation of a chemical compound into its constituent parts by means of the electrical current. The compound to be decomposed is called the electrolyte; the process electrolysis and the vessel containing the electrolyte in which the decomposition takes place is sometimes called an electrolytic cell." Captain Brophy then described the method of electroplating showing how the metal from one end of the circuit was carried through the liquid and deposited on the other. After telling how much current it takes to decompose various metals, especially iron, he states that if a length of seven-inch cast iron pipe one-half inch thick and weighting 449 pounds is subjected to a current of 23.2 amperes for one year it would be entirely consumed were the conditions the same as in an electrolytic cell. However, dry, sand soils are poor conductors, wet loam or clay is better, and in tidal districts where the earth is saturated with salt water, the soil is a still better conductor. When iron pipes are attacked in soil that is always moist, decomposition does not take place uniformly over the entire surface but in spots, so that the amount of decomposition need not be so great as to cause leaks. The same is true of lead pipes and it is not necessary to destroy the whole weight of the metal to cause the pipe to leak. During a somewhat extended experience, the author never found that the corrosion of the pipes in the ground took place evenly over the entire surface.

WHY CORROSION TAKES PLACE

A street railway circuit is composed of a dynamo, an overhead

trolley wire and the rails for the cars. The current passes from the dynamo over the wire, through the car to the rails and earth and so back to the dynamo. Heavy feed wire are necessary to supply current to the wires, as, in a long line, the resistance of the trolley wire to the flow of the current would be too great for the former to carry sufficient current to move the cars. Just so with an engine which can deliver 600 gallons a minute but which cannot deliver an effective stream through a two-inch nozzle attached to a line of hose unless assisted by two or more engines playing through lines siamesed into the play pipe. If all the current was delivered to the motors on the cars, if all this current were returned to the dynamo through the rails, there would be no electrolytic corrosion of water and gas pipes. As the rails are not continuous and have many joints not well bonded, the current does not return entirely by them, but must find other means of travel. The water and gas pipes offer a ready means of transmission. Despite efforts to form perfect bonds between the sections of the rails, the bonding cannot be so perfect that there will be no more resistance to the joint than to the rail so that all the current will keep to the rails. Oxidation of the metal takes place, the resistance of the joint increases and the current leaves the rails for the pipes. When it leaves the latter again the electrolytic corrosion takes place increasing with the current and the number of imperfect bonds at the joints. Were frequent inspection of the bonds made and errors corrected, the pipes would not have to carry the return current to the power house. There is no excuse for this state of affairs and the electrolysis can be prevented if the proper methods are pursued. There are two good means of accomplishing this: the use of the double trolley, thus abandoning the use of the rails as a return conductor, and the careful bonding of the rails and the maintenance of them in that condition by frequent and careful inspection, re-enforcing the rails by return feeders when necessary.

The author describes the only system of double trolley in use in the United States, in Cincinnati, and the use of the underground trolley in New York, Washington and some European cities. He also mentions the fact that another city abandoned the cable for the overhead trolley, not using the underground trolley because of the expense. Coal being cheap, no attempt is made to bond the rails adequately, the managers thinking it cheaper to force the current over the imperfect rail bonds than to bond them well. The lead covering of a large telephone cable is destroyed in a few weeks as a result of this condition. Had the company been compelled to use the cable slot, no trouble would have resulted from electrolysis.

METHODS FOR ITS PREVENTION

A plan used to a great extent to guard against the damage from electrolysis is to connect the negative side of the dynamo with the pipes. If the pipes were without joints this would be an excellent system, but the joints in the pipes cause more resistance to the passage of the current than is offered by the ground and the current leaves the pipes for the ground, returning to the pipe again after the joint is passed. This leaving of the pipes at the joints causes electrolytic action to set up and corrosion to take place.

To prevent the flow of the current over the pipes, the author suggests that the continuity of the metal be broken by inserting insulating joints at suitable points, thus preventing any flow of the current. Proper bonding would have to be supplied the rails. In one city these circuit breakers were attached to the gas pipe system and the corrosion of the joints ceased. In the city of Wheeling, W. Va., tests showed that there was a flow of 300 amperes from the pipe to the rail, but the inserting of circuit breakers stopped the electrolysis.

The author offers three remedies for the prevention of electrolysis: the best possible kind of track construction; draining the pipes of the current; the insertion of circuit breakers or insulators in the pipe lines. The first should be imperative, the second is but a partial remedy, and the last is much superior to the second.

THE NECESSITY FOR SALVAGE CORPS

By Charles H. Swan *

It is a well known fact that fire departments are organized and equipped for the purpose of saving from damage and destruction the lives, the homes and business of mankind.

In order that this most desirable purpose may be accomplished water must be used. So far science has discovered for us nothing more practical than water, and in many of the fires which occur it must be used in large quantities. The very agent which must be used to save property from destruction, causes the greater damage, for it is well known to adjusters of fire losses that the damage from water is much more than the loss from fire.

These facts being admitted, the importance and necessity of salvage corps is at once apparent. An efficient and trained body of men with waterproof covers to place over goods to protect them from dripping ceilings, the prompt removal of water from the building damaged by fire, the covering of roofs which have been burned through to protect the contents of the building from further damage from rain or snow, and the pumping out of basements to secure the greatest salvage possible on the contents damaged, any intelligent fireman can at once see that the fire loss of any city must be materially reduced.

The efficiency of a well equipped fire department is judged by the amount of losses incurred. Continuous and heavy losses will result in higher insurance rates and general dissatisfaction of the public. So the importance and necessity of salvage corps must be felt at once, as they are effective in reducing the fire loss of any city where they are in operation.

While it is generally acknowledged that the salvage corps are a very valuable adjunct to any fire department, the fact remains that many large and numerous small cities are without them, and so the losses continue to increase until the enormous amount of one hun-

* Superintendent Protection Department, Providence, R. I.

dred seventy-three million dollars has been reached in one year, and it seems strange that such an intelligent body of men as the fire chiefs of this country are known to be, should allow their departments to be without such a valuable aid in reducing their fire losses.

Of course it is well known that an honest difference of opinion exists as to who shall bear the expense of supporting a salvage corps, yet this ought not to stand in the way of every city in this country being provided with such efficient means of accomplishing this purpose, for in any case, if the expense comes out of the appropriation of the fire department, or if the underwriters are taxed, it is the public that finally pays the bill. Some of the chiefs, knowing that water causes so much damage, have provided their departments with covers and carry them on their hose wagons or ladder trucks. One chief of quite a large city, had the courage of his convictions, and from his appropriation of the fire department equipped and put into service a salvage corps and to-day considers it one of his most valuable aids in the reduction of fire loss in his city.

The city of New York has the honor of having the first regularly equipped salvage corps in this country. The underwriters of that city, realizing the great loss from damage resulting in the use of water in the extinguishment of fires, appreciated that the contents of the building damaged by fire could be protected by the use of waterproof covers and a great salvage result therefrom. In the year 1839, the underwriters of the city of New York, at their own expense, and they thus established a precedent, bought the apparatus and equipment, hired a building for a station and employed the men which formed the company. For many years this was the only salvage corps in this country. In 1869 Philadelphia established a salvage corps, and other cities followed their examples, until now there are some twenty cities which have salvage corps as a part of the protection from loss and damage by fire and water.

FIRE AND POLICE PERSONALS

—Chief of Police James Lyons, of Terre Haute, Ind., has been presented with a gold diamond-mounted badge as a gift from his fellow members of the police department.

—Chief of Police Waite of Minneapolis, Minn., has warned the public of his inability to protect them against thieves on account of the few men available for the residence districts.

—Frederick W. Ames, former chief of the Police Department of Minneapolis, Minn., has been sentenced to a term of six years in prison after a sensational trial on the charges of bribery.

—Chief Jerome Richards, of the police department of Memphis, Tenn., recently handed in his resignation to Mayor Williams and it was accepted. In his place Mayor Williams has appointed Capt. J. J. Mason.

—Chief of Police Reddy, of Spokane, Wash., was recently held up while a passenger on a street car and robbed. Chief Reddy claims that he was unarmed and powerless to defend himself against the highwayman.

—Henry C. Klein has been appointed Chief of the Fire Department of Janesville, Wis., by Mayor Richardson. Chief Klein is very popular in the city and has spent a good share of his life in the interests of the fire department.

—Chief W. N. Kellogg of the Superior (Wis.) Fire Department has asked that the pay of his men be increased. He bases his request on the fact that the deplorable condition of the streets has more than doubled the hazard of the firemen's life.

—Chief M. E. Higgins of the Albany, (N. Y.) Fire Department expressed himself as greatly pleased with his visit to New York at the convention of the International Association of Fire Engineers. Chief Higgins was elected a director of the Association.

—After a trial by the police board of Augusta, Ga., Chief of Police M. J. Norris was acquitted on the charge of neglect of duty. The Chief was charged with neglect of duty in refusing to entertain a

charge against a cab company which was doing business without a license.

—Chief Jesse C. Poyns, of the Fire Department of Tacoma, Wash., recently returned from a visit to a number of eastern cities and from the convention of the International Association of Fire Engineers held in New York in September. Chief Poyns expressed himself as greatly benefited in the way of information by the trip and he will introduce into the department some of the smaller apparatus which he saw demonstrated during the convention.

—The city of Toledo, O., has met a serious loss in the death of Chief of Police Benjamin Raitz, who died from diabetes from which he had been suffering some twelve years. At the time of his death the chief was fifty-eight years of age and was much thought of in the city. The Council adopted resolutions deploring his death. Chief Raitz has been at the head of the police department for ten years and has succeeded in weathering all the political storms that raged about him.

—Chief of Police Benjamin Murphy, of Jersey City, N. J., is very careful of his men and is anxious to do everything to prevent injury to them. One of his latest orders was that every member of the force should keep one chamber of his revolver unloaded and allow the hammer to rest upon the empty chamber. This order was issued because two of the policemen lately dropped their revolvers on the sidewalk while running and shot themselves. Policemen are ordered hereafter to keep one hand on their pistol pocket when sprinting.

—Ex-Chief of Police S. J. Harwood, of Newport News, Va., is suing Mayor A. A. Moss for \$10,000 damages for alleged defamation of character. He claims that while chief of police the Mayor falsely charged him with failing to report and turn in certain funds he collected. The Mayor admits that he brought the charge, but says that the fines were not reported and it was his duty to have the police commissioners make an investigation. Chief Harwood was removed about a year ago on charges for which the Mayor was responsible.

WHAT POLICE AND FIREMEN ARE DOING

England Uses Chemical Extinguishers—Eight Hour Day for City Employees—Card Index System for Rochester Police

ENGLAND USES CHEMICAL EXTINGUISHERS.—While England may be somewhat behind us in the use of high-power fire engines, throwing heavy volumes of water, she is very much up-to-date in the employment of large chemical extinguishers which often accomplish as much as vast quantities of water, and with less damage. The Borough of Aston has been provided with a new chemical engine with a 74-gallon water cylinder, and at a recent test a pressure of 60 pounds was obtained from it in 20 seconds and a large fire extinguished in a minute and a half.

POLICE RESPONSIBLE FOR STREET CONDITION.—Chief Kiely of the St. Louis Police Department has lately sent forth an order to his men that henceforth they are to be held strictly responsible for the condition of the streets on their beats. They must notify the citizens in person that the ordinance against placing dirt or rubbish in the streets will be enforced and the beat of any officer which is found in an uncleanly condition will be the cause of charges being preferred against him. No excuses will be accepted. Officers are to inform their captains of any improper condition of the streets under their supervision.

HOUSE TO HOUSE INSPECTION.—One of the best health provisions instituted in the city of Chester, Pa., and which should be adopted in other cities, was the house to house inspection of the health officers. The work did not cost much and prevented much sickness by removing the cause of disease from many homes. Whenever the inspectors found conditions that were menacing the health of the household, he ordered them rectified and pointed out the best way to accomplish them. The fact that houses were to be inspected caused many to give their premises a cleaning that they would not have received otherwise. The house to house inspection is in line with the modern theory of prevention rather than the curing of evils.

AN UNFAIR COMPARISON.—Chief John T. Mertz, of the fire department of Akron, O., seriously objects to the comparison of his fire department with that of other Ohio cities which has been made by Chief W. H. Loller, of Youngstown, O., which appears in the September number of THE MUNICIPAL JOURNAL. Chief Mertz says that Chief Loller does not state in his comparison that Akron has four fire engines in service and Youngstown none, and also that Youngstown owns its water system while Akron is compelled to pay \$15,000 annually out of the fire funds for water. These figures should be deducted from the figures given in Chief Loller's comparison so as to place the two departments on an equal footing. Deducting this sum from the expenditure by the Akron department it would amount to \$44,494.10, and from this should also be taken the expense of the fire engines.

LARGER POLICE FORCE IN LANCASTER.—The city of Lancaster, Pa., has been extending its limits so rapidly that it was necessary a short time ago to add a considerable number of men to the police force. Eleven men in all were added, making a total force of thirty-five men where there were but twenty-four formerly. The city has a population of 45,000, and for a city of its size is very orderly. Arrests are mainly for vagrancy and disorderly conduct. The tramp problem, which has been a source of great trouble to the authorities, both in Lancaster and elsewhere, has been solved in the former city by arresting every one found within the city limits and committing them to the county jail for from thirty to ninety days at hard labor. Work, next to water, being the greatest terror of tramps, the city is given a wide berth by these "turn-pike sailors." The police force at present consists of the Chief, Harry M. Herr, a lieutenant, two sergeants, four patrol drivers and twenty-seven policemen. Chief Herr was reappointed by the new Mayor, Chester W.

Cummings, when the latter was elected, for he appreciated the excellent work that Chief Herr had done in keeping the city free from crime and disorder.

THE POLICE OF NEWTON.—Before receiving an appointment to the police force of Newton, Mass., candidates must pass a civil service examination, embracing the three R's and the duties of an officer. The appointment is then made by the chief from a certified list, three names for each vacancy. After six months' probation as a reserve policeman at \$2 per day, satisfactory men receive a permanent appointment as reserves at a salary of \$2.25 a day. Men on the regular force receive \$900 for the first year, \$1,000 for subsequent years until the fifth and \$3 per day thereafter. The city provides revolver, club and hand-cuffs, but each officer must procure two uniforms a year. Patrolmen are on duty eight hours every day in the week and receive a vacation of two weeks during the year. Without permission from headquarters, however, they cannot leave the city. The police signal system is invaluable, the thirty-seven boxes being in constant use day and night. Duty calls are received silently at headquarters and recorded on a tape. Other calls ring a bell to attract the houseman's attention. If headquarters wishes to talk with a patrolman, a switch set for his box, operates a tapper when next he makes his duty call, and he then calls up to see what is wanted. The force is not large enough for the work required, there being but thirty-nine regular and twelve reserve patrolmen. There are four stations, an ambulance, a patrol wagon and a prisoners' van.

EIGHT HOUR DAY FOR CITY EMPLOYEES.—An agitation has been set on foot in St. Paul, Minn., for an eight hour day for all city employees. All classes of city employees except firemen, judges and clerks of election, are to be beneficiaries of the scheme. While the clerks at the city hall enjoy the eight hour day, street cleaners and employees of the engineer's department work ten hours. The plan of eight hours has been tried in some police departments and, in Minneapolis, has proved quite successful. This gives three platoons for the twenty-four hours. In St. Paul the police work in three shifts, but these are not of the same length, the longest being in the day time. The day men are seldom assigned to night duty. The two night platoons alternate. The day men work ten and a half hours with an hour for dinner and one man patrols two beats while the other takes half of the hour for dinner. The first night shift is on duty nine hours and the second ten hours less, in each case, twenty minutes for lunch. The day men go on at 7 a. m. and off at 6:30 p. m.; the first night shift goes on at 5:30 p. m. and off at 2:30 a. m.; the second night shift take their beats at 9 p. m. and are relieved by the day men at 7 o'clock a. m. The firemen cannot be permitted to enjoy this scheme of eight hours because of the extra amount of men that would be necessary. Inasmuch as firemen are not actively engaged more than eight hours a day, except in emergencies, they do not need the benefit of shorter hours.

CARD INDEX SYSTEM FOR ROCHESTER POLICE.—In the police department of Rochester, N. Y., there has been introduced lately a card index system embodying the names and records of prisoners and also facts concerning the policemen and detectives. Commissioner Gilman gives the credit for the installation and successful working of this system to Chief Clerk C. A. Simmons. There are three sets of cards in duplicate. One set is colored yellow and is devoted to "arrests." This card gives the date, name of officer making the arrest, person arrested, the offense, date of offense, remarks, date of filing, and signature of official making report. The "offender's card" is salmon colored and on this are the dates, name of person arrested, officer making the arrest, offense, disposition of the case and signature of officer of the precinct. The third card is blue and is for "miscellaneous reports." They are made out by the director of detectives in

the case of detectives or by the captain in the case of policemen. They are designed to show, day by day, the work of every officer in the department. To ascertain the work of any member of the department it is only necessary to go through the set of cards filed under his name. In the same way all offenders can be traced and their history as far as the department has anything to do with it, learned. One set of the cards is kept at the central police station and the other at the Commissioner's office. The "offenders cards" are kept at headquarters until the case is disposed of, when they are filed with the others.

An Eighteenth Century Fire Engine

THE accompanying illustration shows one of the old time fire engines of England. It was recently discovered at Stowmarket and proves an interesting relic of the past. It did duty in the town for many years and, as shown by the sign on the engine, was presented to the town by Nathaniel Gordon, Esq., in 1734. Despite the many

years that it has lain away unused, it is in an excellent state of preservation, considering its age.

The engine is composed of a wooden well, six feet long by five inches wide and lined with copper. At either end are openings for the purpose of receiving water which was fed to it by buckets. The pump itself is at one end and is worked by ordinary hand brakes. Four small solid wooden wheels support the body of the engine. There are none of the leather buckets left that were used to feed the water well, but the delivery pipe, which is six feet long, can still be at-



OLD ENGLISH FIRE ENGINE

tached. The engine is painted the usual red color and on the front of the pump are printed instructions for properly working it. One of the suggestions for keeping the pump in order reads, "The pevets of the long iron spendil" should be "drest with sallet oyl and tallow." After using the hose the men are told that it should be "liquored with neatsfoot oyl, bees wax, and tallow, and quolied up." Over the instructions was originally a covering of horn to protect them from injury, but of the horn covering, only a small portion now remains.

Campaign Against Spitting

THE habit of expectorating in street cars and on the sidewalks has caused health authorities no end of trouble. Signs are placed in conspicuous places forbidding the practice and spasmodic efforts are made to enforce the rules. Duluth, Minn., recently adopted an effective method of catching the violators of the anti-expectorating ordinance. Officers in citizens clothes were placed on the street cars on the advice of the company and a watch was kept for spitters. After once warning a person the officer arrested him if the offence was repeated and a fine of \$5 or a term of ten days in jail was the penalty. It is claimed, and with good reason, that the conductors have too much to do to watch for spitters and that the "plain clothes" officers are the best for the purpose. Salt Lake City is another place where the authorities are determined that people shall not spit on the walks with impunity. Signs were made and tacked up along the principal streets warning people of the ordinance against spitting and the penalty for violation. A large red cross is in the centre of the sign and there is no excuse for not seeing them. Dayton, O., has a large number of signs warning against spitting

on the sidewalks and placed on telegraph poles and in hotels, business houses and public places. Sherman, Tex., has passed an ordinance fining any person who expectorates on any sidewalk or on the floors or walls of public buildings. Expectorating on the decks or in the cabins of ferry boats is prohibited in Duluth, Minn., and the Health Board of New York has adopted an ordinance imposing a fine of \$50 for spitting on the sidewalks or upon the floors of public halls, tenement houses, theatres, hotels or other public buildings. Owners of tenements, hotel men and theatrical managers must provide cuspidors and post notices containing the provisions of the ordinance.

Foreign Firemen Belong to Military

THE military bearing of the men is due to the intimate connection between the fire departments and the army. Friends of mine, who have watched the fires in Munich, tell me that after the company reaches a fire, the roll is called before the men are allowed to attack the blaze; and even then the men work by signals given by whistle. In Germany, France, and Russia, every fireman has been a soldier first. In Paris, the department is an army organization, the *Sapeurs-Pompiers* being regular soldiers in government employ, commanded by a colonel of the regular army. The advantages are that the men take more kindly to discipline than our firemen, and make a better appearance on parade; the disadvantages, that they lack the quick resources and initiative of our men. They are lost without a leader and the word of command. In London, as is still the case in some of our American cities, a part of the fire department is composed of volunteers, working as an auxiliary force. The life-saving corps of London, whose apparatus is often housed in a species of booth, standing in the middle of the street, is partly of this nature. In Dublin, the volunteer department is of almost as much importance as the paid department. In Germany, besides the regular army to draw upon for officers and men, the Turn-Vereins furnish excellent material. In the small towns, the volunteer fire-force is wholly made up of members of these Vereins, who add fire-fighting to their gymnastic exercises, games, and songs,—From "Fire-Fighting To-Day—and To-Morrow," by PHILIP G. HUBERT, JR., in *Scribner's*.

Captain Piper to His Squad

Say, Copper, walk along the curb,
And don't you hug that wall
As if it were some kitchen maid
Stuck on your stature tall.

Say, Copper, walk along the curb,
So when you stop to chat
Some interesting friend of yours,
We'll know where you are at.

Say, Copper, walk along the curb,
Where you can see the street,
And not have quite so wide a space
To wander from your beat.

Say, Copper, walk along the curb,
Where other people don't,
And possibly you'll see some things
That otherwise you won't.

Say, Copper, walk along the curb,
By daytime and by night,
Where there is little chance for you
To disappear from sight.

Say, Copper, walk along the curb,
And let your duty be
To tend to business all the time,
Or you will hear from me.
See?

—W. J. L., in *The Sun*.

SALARIES OF FIREMEN IN AMERICAN CITIES

Including Those Having a Population of Twenty Thousand and Over

| City. | Chief. | Asst. Chief. | Dist. Chief. | Captain. | Lieutenant. | 1st yr. | Privates. | 2nd yr. | 3rd yr. | Probationers. | Supt. Fire Alarm. | No. paid men. | No. call men. | No. volunteers. | Has Firemen's Relief Asso. |
|------------------------|---------|-------------------|--------------|----------|-------------------|----------|-----------|---------|---------|---------------|-------------------|---------------|---------------|-----------------|----------------------------|
| Akron, O. | \$1,500 | c\$300 | .... | \$1,080 | \$972 | \$900 | .... | .... | .... | \$630 | \$1,500 | 36 | 18 | 0 | Y |
| Allentown, Pa. | 900 | 100 | .... | .... | .... | .... | .... | .... | .... | .... | 120 | 0 | 0 | 874 | Y |
| Atlanta, Ga. | 4,000 | 1,400 | \$1,300 | 1,200 | 1,080 | 660 | \$780 | \$780 | \$420 | 1,200 | 120 | 120 | 0 | 0 | Y |
| Atlantic City, N. J. | 500 | 200 | .... | .... | .... | .... | .... | .... | .... | 1,200 | 0 | 0 | 0 | 435 | Y |
| Allegheny, Pa. | 2,500 | 1,800 | .... | 1,200 | 1,080 | 1,080 | 1,080 | 1,080 | .... | 2,400 | 113 | 0 | 0 | 0 | Y |
| Albany, N. Y. | 3,000 | 1,500 | 400 | 300 | 840 | 780 | .... | .... | .... | 1,500 | 122 | 62 | 0 | 0 | Y |
| Altoona, Pa. | 1,000 | .... | .... | .... | .... | 540 | 600 | 600 | 188 | 780 | 22 | 24 | 0 | 0 | Y |
| Auburn, N. Y. | 1,300 | 925 | .... | 860 | .... | 785 | .... | .... | .... | 860 | 29 | 13 | 0 | 0 | Y |
| Amsterdam, N. Y. | 800 | x700 | .... | *720 | .... | 760 | .... | .... | .... | .... | 9 | 0 | 500 | 0 | NN |
| Austin, Tex. | .... | .... | .... | .... | .... | d600 | .... | .... | .... | .... | 8 | 0 | 406 | 0 | N |
| Bay City, Mich. | 1,500 | 300 | 240 | 240 | 240 | 240 | .... | .... | .... | 720 | 15 | 23 | 0 | 0 | Y |
| Bloomington, Ind. | 600 | 540 | .... | 520 | .... | 480 | .... | .... | .... | .... | 6 | 5 | 0 | 0 | NN |
| Burlington, Ia. | 990 | 825 | .... | .... | .... | 660 | 660 | 660 | .... | .... | 12 | 13 | 0 | 0 | NN |
| Boston, Mass. | 3,500 | 2,400 | 2,000 | 1,600 | 1,400 | 900 | 1,000 | 1,100 | 720 | 3,200 | 722 | 83 | 0 | 0 | Y |
| Brockton, Mass. | 2,000 | 1,550 | c250 | 1,200 | 1,175 | 800 | 900 | 1,000 | c200 | x | 38 | 40 | 0 | 0 | Y |
| Baltimore, Md. | 2,000 | .... | 1,400 | 1,100 | 1,000 | 800 | \$1,100 | th900 | 500 | 1,800 | 426 | 0 | 250 | 0 | Y |
| Bessemer, Ala. | 300 | 180 | .... | .... | .... | 120 | .... | .... | .... | .... | 3 | 10 | 0 | 0 | NN |
| Binghamton, N. Y. | 1,200 | 400 | .... | .... | .... | 540 | 660 | .... | .... | 780 | 18 | 6 | 520 | 0 | Y |
| Bayonne, N. J. | .... | .... | .... | .... | All Volunteers. | 720 | 780 | 840 | 730 | 900 | 48 | 0 | 600 | 0 | Y |
| Birmingham, Ala. | 1,800 | .... | .... | 900 | .... | 720 | 780 | 840 | 730 | 900 | 48 | 0 | 0 | 0 | N |
| Colorado Springs, Col. | 1,400 | 1,080 | .... | 900 | 840 | 840 | \$960 | .... | .... | 900 | 20 | 0 | 90 | 0 | — |
| Council Bluffs, Ia. | 1,000 | 720 | .... | 720 | .... | 720 | 720 | 720 | .... | 980 | .... | .... | .... | .... | N |
| Cattanooga, Tenn. | 1,500 | 960 | .... | 840 | 720 | 720 | \$900 | .... | 360 | 900 | 40 | 10 | 0 | 0 | Y |
| Columbus, O. | 2,000 | 1,200 | .... | 1,020 | 960 | 720 | 900 | 900 | .... | 1,200 | 188 | 0 | 0 | 0 | Y |
| Cincinnati, O. | 5,000 | 2,300 | 2,200 | 1,260 | 1,116 | 1,080 | .... | .... | 730 | 1,800 | 348 | 0 | 0 | 0 | Y |
| Chicago, Ill. | 6,000 | 4,500 | 2,750 | 1,650 | 1,290 | 840 | 960 | 1,050 | 800 | 5,000 | 1,150 | 0 | 60 | 0 | Y |
| Canton, O. | 1,200 | 900.50 | .... | 840 | 820 | 780 | 780 | 780 | .... | 840 | 40 | 0 | 39 | 0 | Y |
| Cedar Rapids, Ia. | 1,000 | 780 | .... | 720 | 660 | 600 | 600 | 600 | .... | 900 | 23 | 0 | 0 | 0 | N |
| Cohoes, N. Y. | 1,200 | v | v | v | v | v | v | v | .... | 900 | 18 | 4 | 140 | 0 | NN |
| Covington, Ky. | 1,800 | 900 | .... | .... | .... | 65 | 65 | 65 | .... | .... | 33 | 0 | 0 | 0 | NN |
| Cleveland, O. | 3,500 | 2,500 | 2,300 | 1,323 | 1,185 | 660 | 870 | 1,104 | 1,500 | 1,426 | 0 | 0 | 0 | 0 | Y |
| Cambridge, Mass. | 2,000 | 1,400 | .... | 1,080 | 1,050 | 820 | 920 | 1,020 | .... | 2,000 | 59 | 67 | 0 | 0 | Y |
| Chelsea, Mass. | 1,200 | 1,000 | .... | p875 | c125 | c125 | .... | .... | .... | q1,400 | 19 | 57 | 0 | 0 | Y |
| Decatur, Ill. | 1,200 | .... | .... | 900 | .... | 780 | 840 | .... | .... | 840 | 27 | 0 | 0 | 0 | Y |
| Duluth, Minn. | 2,500 | 1,200 | .... | 960 | 900 | 720 | 780 | 840 | 720 | 1,200 | 85 | 0 | 0 | 0 | Y |
| Dayton, O. | 2,500 | 1,350 | .... | 1,020 | 960 | 720 | 900 | 900 | .... | 1,000 | 112 | 0 | 0 | 0 | Y |
| Detroit, Mich. | 4,000 | 3,000 | 1,800 | 1,200 | 1,000 | 800 | 800 | 1,185 | 540 | 1,800 | 500 | 0 | 0 | 0 | Y |
| Des Moines, Ia. | 1,500 | 1,200 | r1,000 | 930 | .... | 720 | 840 | 840 | b600 | 1,000 | 78 | 0 | 0 | 0 | N |
| Dallas, Tex. | 1,500 | 960 | k900 | 780 | \$900 | .... | .... | .... | .... | 1,080 | 53 | 0 | 0 | 0 | N |
| Elgin, Ill. | 1,000 | 900 | .... | 840 | .... | 660 | 780 | .... | .... | e1,000 | 21 | 0 | 0 | 0 | Y |
| Elmira, N. Y. | 1,400 | .... | .... | 840 | 780 | 480 | 528 | 576 | .... | 960 | .... | .... | .... | .... | Y |
| Easton, Pa. | 1,200 | c175 | .... | c100 | .... | 600 | c75 | .... | .... | x | 0 | 28 | 75 | 0 | Y |
| Everett, Mass. | 200 | 100 | .... | 936 | 936 | 936 | 936 | 936 | .... | 936 | 17 | 18 | 0 | 0 | Y |
| Erie, Pa. | 1,500 | 1,000 | .... | 780 | .... | 720 | .... | .... | .... | 1,000 | 42 | 28 | 0 | 0 | Y |
| Ft. Wayne, Ind. | 1,500 | .... | .... | 840 | \$960 | 660 | 720 | 780 | .... | 1,080 | 59 | 0 | 0 | 0 | Y |
| Fitchburg, Mass. | 1,200 | 190 | 190 | 140 | 135 | 130 | 130 | 130 | .... | 1,000 | 17 | 78 | 0 | 0 | Y |
| Fall River, Mass. | 2,500 | 750 | 400 | 1,050 | .... | 900 | .... | .... | .... | 1,200 | 94 | 95 | 0 | 0 | Y |
| Grand Rapids, Mich. | 2,000 | 1,500 | 1,200 | 1,000 | 843.15 | 620.50 | 777.45 | 803 | 547 | 1,500 | 120 | 0 | 0 | 0 | Y |
| Gloucester, Mass. | 800 | .... | 150 | 75 | 75 | 75 | 75 | 75 | .... | 200 | 17 | 176 | 0 | 0 | Y |
| Galveston, Tex. | 1,500 | .... | .... | 840 | .... | 720 | .... | .... | .... | .... | 51 | 0 | 0 | 0 | L |
| Houston, Tex. | 1,800 | 1,080 | .... | 840 | 600 | 600 | .... | .... | .... | 1,500 | 59 | 0 | 0 | 0 | aN |
| Harrisburg, Pa. | 900 | 100 | .... | .... | Volunteer System. | .... | .... | .... | .... | 800 | 0 | 0 | 1,200 | 0 | Y |
| Holbrook, Mass. | 1,900 | 1,100 | .... | 900 | 780 | 600 | 750 | 780 | .... | 1,200 | .... | .... | .... | .... | Y |
| Hoboken, N. J. | 2,000 | 1,600 | .... | 1,200 | \$1,100 | 1,000 | .... | .... | .... | 1,000 | 59 | 0 | 0 | 0 | Y |
| Haverhill, Mass. | 1,500 | c300 | c300 | 1,046.50 | 1,001 | c200 | .... | .... | .... | 1,200 | 25 | 84 | 0 | 0 | Y |
| Hartford, Conn. | 2,500 | c350 | .... | c300 | \$1,200 | c225 | d900 | h800 | .... | 1,750 | 69 | 57 | 0 | 0 | .. |
| Jersey City, N. J. | 2,500 | 2,000 | 1,500 | 1,200 | 1,000 | .... | .... | .... | .... | 2,000 | 190 | 0 | 0 | 0 | Y |
| Joliet, Ill. | 1,200 | .... | .... | \$890 | .... | .... | .... | .... | .... | 1,000 | 30 | 0 | 0 | 0 | N |
| Johnstown, Pa. | .... | .... | .... | .... | Volunteer System. | .... | .... | .... | .... | 900 | 16 | 0 | 550 | 0 | Y |
| Jackson, Mich. | 1,200 | 1,000 | .... | 700 | 660 | 600 | 660 | 660 | 480 | 900 | 34 | 0 | 0 | 0 | N |
| Kansas City, Kans. | 1,400 | 1,000 | .... | 75 | 70 | 65—70 | 70 | 70 | 65 | .... | 40 | 0 | 0 | 0 | Y |
| Kalamazoo, Mich. | 1,350 | 1,000 | .... | 840 | .... | 600 | 660 | 720 | .... | x | 19 | 10 | 0 | 0 | Y |
| Knoxville, Tenn. | 1,200 | 900 | .... | 720 | .... | 660 | 660 | 660 | .... | 840 | 29 | 3 | 0 | 0 | N |
| Kansas City, Mo. | 2,835 | 1,875 to 1,417.50 | .... | \$1,020 | .... | 907.20 | .... | .... | 730 | g | 218 | 0 | 0 | 0 | Y |
| Lynn, Mass. | 1,350 | 1,000 | c350 | c260 | c255 | c250 | \$960 | d900 | .... | 1,500 | 66 | 103 | 0 | 0 | Y |
| Lowell, Mass. | 2,000 | 1,500 | c400 | 1,095 | 1,003.75 | 1,003.75 | .... | c200 | .... | 1,200 | 82 | 94 | 0 | 0 | Y |
| Lincoln, Neb. | 1,500 | .... | .... | 870 | 780 | 600 | 660 | 720 | 600 | 840 | 32 | 0 | 0 | 0 | N |
| Little Rock, Ark. | 1,200 | 990 | 990 | 870 | d792 | 600 | .... | .... | .... | .... | 32 | 0 | 0 | 0 | Y |
| Leavenworth, Kans. | 1,200 | 840 | .... | .... | .... | 600 | 720 | .... | 600 | .... | 14 | 0 | 0 | 0 | N |
| Lexington, Ky. | 1,500 | 900 | .... | 780 | .... | 720 | 720 | 720 | .... | 720 | 20 | 0 | 0 | 0 | N |
| Memphis, Tenn. | 2,400 | 1,500 | .... | 1,200 | 1,100 | 840 | 960 | \$1,200 | .... | 2,000 | 337 | 0 | 0 | 0 | Y |
| Manchester, N. H. | 1,500 | c350 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | Y |
| Milwaukee, Wis. | 4,000 | 2,100 to 2,000 | .... | 1,320 | 900 | 900 | 900 | 900 | 900 | 1,500 | 89 | 0 | 0 | 0 | Y |
| Minneapolis, Minn. | 3,150 | 2,000 | 1,470 | 1,071 | 945 | 913 | 882 | 819 | 630 | 1,164 | 308 | 0 | 0 | 0 | Y |
| Mobile, Ala. | 1,500 | 1,200 | .... | 720 | .... | 600 | 600 | 600 | .... | 900 | 34 | 0 | 0 | 0 | N |
| Macon, Ga. | 1,200 | 840 | .... | 720 | .... | 600 | \$900 | s720 | .... | 1,200 | 57 | 0 | 0 | 0 | N |

N No. Y Yes. x Serves as superintendent of fire alarm. † Not graded. c Call men. v Volunteers. § Engineer of steamer. * Foremen. ‡ Assistant foremen. z Substitutes. w Battalion chief. s Stokers. b Watchmen. d Drivers. t Tillermen. h Hostlers. r Secretary. k Senior captain. e City electrician. g Alarm kept up by telephone company. a Union. || 4th year, Chicago, \$1,134; Brockton, \$1,134; Boston, \$1,200; Detroit, \$900; Pittsburg, engineers, \$1,100; Providence, \$1,095; New Haven, \$900. p Permanent. q Superintendent of wires. m After third year. f First six months. u After six months. L About to organize one. h Hosemen.

(To be concluded in December.)

LITERATURE ON MUNICIPAL TOPICS

Reviews of Some Important Books—What the Magazines and Reviews Have to Say About Civic Affairs—Municipal Reports Received

Books

Brown's *Directory of American Gas Companies* for 1902 is similar to former editions, but of course has been brought up to date as regards the statistics of the companies. This book contains an immense amount of material of interest to municipal officials, for it shows the prices asked by gas and electric plants, both private and municipal, for their products, as well as the names of the officials of the different companies, process of manufacture, the number of consumers supplied, etc. It was compiled and corrected by E. C. Brown, and can be had from the Progressive Age, 280 Broadway, N. Y. City, N. Y., for the sum of \$5.00.

The Engineering News Publishing Company, of New York, has issued its first edition of *The Municipal Year Book*. This is probably the first attempt in America to collect such important data about the municipalities, and inasmuch as the difficulties to overcome were much greater than will be encountered in future editions, the result is not as satisfactory as coming editions will ensure. The book deals with the statistics of 1,524 places of 3,000 population and upward, according to the census of 1900, and contains an immense amount of valuable matter relative to these municipalities. Unfortunately, the names of officials are not quite up-to-date, but this doubtless resulted from the period which elapsed between the time of sending for the data and its incorporation in the book. In the first portion will be found tables showing towns having water works, electric lights, telephones, water and sewage purification plants, how different towns care for their garbage, the number of municipal bath houses, the laying of electric wires underground, and exhibit of the municipal and private ownership of the United States, etc. The second part of the book consists of an arrangement of towns according to their states and territories and the grouping of important statistics in regard to them. The future editions of this book, as stated, should be more up-to-date as regards the names of city officials. Unfortunately the press work is not first-class, but the important data are there and probably all these minor errors will be corrected in the future issues. Price, cloth, 310 pp. \$3.00.

THE far reaching forests of America and their apparently inexhaustible supply of timber has engendered the idea that it is not necessary that our trees should be protected and that the greatest care should be taken to prevent undue loss by fire or other injurious agencies. The subject of forestry, therefore, is not considered seriously. John Gifford, the assistant professor of Forestry in Cornell University, has stated that "Forestry is both misunderstood and underrated in this country" and that the American people will treat the subject in the proper spirit when the misconceptions are dispelled.

In *Practical Forestry*, Mr. Gifford endeavors to show what forestry is. He has endeavored also to make the book as practical as possible so that every one may obtain hints as to the best methods to pursue in caring for their woodlands. He says that the neglect of the forests is due to ignorance and it is the purpose of this book to overcome it by conveying practical information and arousing an interest in the subject.

Part I contains chapters on wood-lots on farms, estates and the relation that agriculture, horticulture and landscape gardening bear to forestry; the forest canopy, forest floor and wood-mass; the work of the forest in modifying the destructive forces of nature. Part II deals with the "Formation and Tending of the Forests," including means for their protection, part III with the "Industrial Importance of Forests" and part IV with the principal Federal and state reservations and a list of American hardwoods and conifers. Some excellent illustrations show scenes in different typical American forest regions. Published by D. Appleton and Company, New York. Cloth, 284 pages, \$1.20 net.

Periodicals

In the August number of *The Chautauquan* Mr. E. G. Routzahn writes on *The American League for Civic Improvements*. Chautauqua, N. Y. Price \$2.00 per year.

The September number of *The Municipality* contains an article by W. D. Kirchoffer, C. E., on *Wisconsin Water Supplies*. Madison, Wis. Price \$1.00 per year; 10 cents per copy.

In the September issue of *The International Quarterly* appears an article by Will H. Low on *National Art in a National Metropolis*, in which the author takes for his subject the city of New York. Burlington, Vt., \$4.00 per year; \$1.25 per copy.

Sewerage Disposal at Exeter is the subject of an article in *The Surveyor* for August 22nd. It is a short description of the plant in that city and states briefly the success that has been obtained in the works. London, England. Price, 3d. per copy.

The *San Antonio Daily Light* has published a review of the city of San Antonio, showing up the various points of interest about the city and its public buildings and manufactories. This is the twenty-first anniversary edition of the *Daily Light* and the issue does credit to that paper in far off Texas.

The October issue of *The Century* has an interesting article on *Art in Public Works* and makes special reference to the American bridges both beautiful and ugly. He says that the bridges of Paris, London and Berlin are good rather than otherwise, but that on this side of the water the reverse is true. New York, N. Y. \$4.00 per year; 35 cents per copy.

In *The Surveyor* for September 5th, 1902, we find a paper on the *Recent Practice in Refuse Disposal*, by F. Leslie Watson, of Leeds, England. This paper was delivered before the Royal Institute of Public Health at a recent congress at Exeter England. In the same issue is a paper by Mr. W. F. Goodrich on *Refuse Destructors*. This paper was also delivered before The Institute. London, England. Price per copy 3d.

In the *Sanitary Inspector's Journal* for August, 1902, appears the proceedings of the Sanitary Inspectors' Association, and among them an address by the president, Sir James Crichton-Browne, on *Malaria in Relation to Sanitation*. The paper is a long one and shows what part flies and mosquitoes play in carrying not only malaria, but other diseases, from place to place, and describes some experiments that were made to show that these insects are the direct cause of diseases of this character. London, England. Price per year, 7 shillings; per copy, 6d.

The June number of *Municipal Affairs* just issued has a large number of papers on municipal topics. *Municipal Housing in Germany*, by Karl Bücher; *Referendum in Party Nominations*, by Robert H. Whitten; *Art and Education*, by George E. Bissell; *Pictures in Public Schools*, by Wilfred Buck. Under "Home Rule Problems" are articles by John G. Agar on *Legislative Interference in New York* and *The Pennsylvania Rippers*, by Clinton Rogers Woodruff; *Rural Domination of Cities in Connecticut*, by Guy Stanton Ford; *Home Rule in Ohio*, by Miles Roy Maltbie; *Local Self-Government in Illinois*, by Clayton E. Crafts; *Kaiser vs. Berlin Council*, by W. E. Hotchkiss. Other articles are *The Franchise Situation in Cleveland*, by Edward W. Bemis; *Municipal Socialism in England*, by James Boyle. New York, N. Y. Price per volume \$2.00; price per copy 50 cents.

ECONOMY IN ROAD BUILDING

Village, Town and City Officials Specially Interested—A Combination Adapted to All Conditions—A Money Saver in Street and Road Construction

THE greatest difficulty that meets a community when it undertakes to procure better roads is the cost of building them. A permanent, good road cannot be made without the use of a steam roller, and the cost of such a machine—good for no other purpose,—is too great for a township, village or country to spend, especially if in addition to the roller, it becomes necessary to purchase a crusher and an engine with which to run the crusher, and also to hire teams to draw the gravel.

A COMBINATION OUTFIT

A great part of this difficulty can now be overcome by the purchase of a Port Huron road roller, which is also a traction engine. This

Besides, the streets of many of our small towns and villages are often almost impassable during the wet season. As a matter of fact, the money which is now expended in the improvement of town and village streets is often wasted, or worse, as the modern methods of road construction are not taken into consideration. No road roller is used and no attempt is made to build a scientific road. With the investment of a few thousand dollars, this plant could be purchased, and permanent, beautiful streets could be constructed and maintained at a trifling cost, when the value received is taken into consideration.

The Port Huron Engine Company has made a scientific study of the construction of roads, and this particular outfit is planned upon economical principles. A little money is made to go a great ways.

Another part of the outfit is a patented dump car with an attachment for automatically spreading any required thickness of stone or gravel on the road. The stone can be dumped from the crusher into the car, hauled to the road with the roller, and spread over the road more evenly and rapidly than by the use of men and teams, and much more cheaply. By the use of this patent dump car sheets of crushed stone, gravel, or sand may be spread four and one-half inches wide and any thickness between one and eight inches, at walking speed.

Frequent sprinkling during the rolling process is one of the essential parts of good road construction in order to obtain the best results, and for this purpose an engine tender, with a sprinkling attachment fastened to the tank, especially suited for the use of the Port Huron roller, has been designed and built.

THE WONDERFUL DIRT ELEVATOR

Where new roads are to be built and deep cuts have to be made, the value of a dirt elevator is very evident. It ploughs up the earth, lifts it in the wagons, or into the centre of the road, and does it much more quickly and cheaply than a horse machine, or men with shovels.

The dirt handler, which may or may not be included in this outfit as the needs may require, is one of special design. It has demonstrated its efficiency on many occasions, and it is a remarkable machine. Our readers will be interested in a description of its construction and operation.

The machine consists chiefly of an adjustable frame attached to rear of the engine. It has two rollers around which is placed a wide 61-ply endless canvas belt. The upper end of frame can be ad-

engine will run the crusher, haul the stone to the road, and roll the road, and it costs about half the price of an ordinary roller—good for nothing but rolling.

Used as a traction engine, it will haul easily, fifteen tons of stone over an ordinary road. As a road roller it will do better work rolling macadam, dirt or gravel roads, than an ordinary roller that costs twice as much. Used as a stationary engine, simply drop the gear lock and it cannot move. It will furnish power enough to run any moderate size pressure.

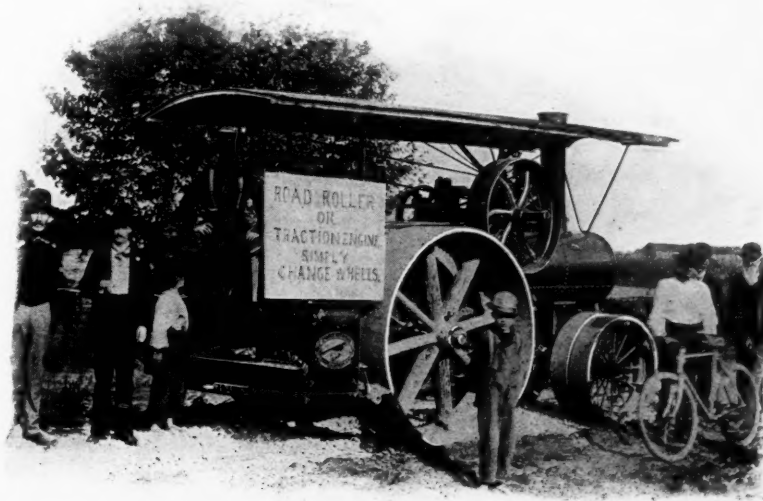
These statements are not guesses, but facts which have been demonstrated by actual operation. Several miles of roads have been built in and about the city of Port Huron—one, a United States Government road,—and in building them the Port Huron roller has been used for the different purposes, and thus demonstrated its efficiency. Besides, these rollers have been sold to contractors and county commissioners for use on streets, highways, and elsewhere, and the owners, in every instance, have expressed their perfect satisfaction.

WILL INTEREST TOWN AND VILLAGE OFFICIALS

The officials of small towns, particularly, will be interested in the work of this combination outfit. All the good results of an expensive plant can be obtained by this outfit. So that, the expenditure necessary will not be a burden to any village or town. On the other hand, it will be an exceedingly wise investment, for just in the matter of saving the extra expense involved in the hauling of produce to market over bad roads as compared with the cost over good roads, would pay for the plant in a short time. Any highway, to serve its purpose well, should be usable all the year round. It is a lamentable fact that most of our public highways, no matter what state you visit, are in a wretched condition and in sad need of improvement.



THE GOOD ROADS OUTFIT EN ROUTE



TRACTION ENGINE CONVERTED INTO A ROAD ROLLER



THE STONE CRUSHER AT WORK

justed to suit wagons, or delivery of dirt to best advantage in grading the road.

At upper end of frame is a distributing device, which is used when the engine is delivering dirt to the road grade. By means of this distributor, dirt can be delivered to almost any point desired on the road.

The plow is fastened to the axle of the engine, so that the plow delivers the dirt directly on to the lower end of the elevator.

Levers are provided for the engineer to quickly raise and lower the plow and adjust the elevator. A water tank of large size is provided at the front end of the engine for carrying a supply of water. This tank at the front end helps to distribute the weight of the engine on the four wheels. The peculiar shape of the roller on which the canvas belt travels is such that the belt is held in a curve toward the centre, which assists in keeping the dirt in the centre of the elevator.

It will be seen that in the construction of this machine little labor is placed upon the traction part of the engine, as the power driving the elevator is transmitted from the fly wheel direct to the driving shaft of the elevator. The only labor that is placed upon the traction part of the engine is that required to propel the engine and draw the plow.

DIRT MOVED FOR ONE CENT A YARD

This dirt handler has a capacity of from one hundred to one hundred and fifty cubic yards of dirt per hour, according to the soil handled. Upon an estimate of one cent a yard the total cost for a day's work would range from \$10 to \$15.

A contractor can buy this outfit, or he can rent an engine and buy the attachment at prices which will make the

| | |
|--|--------|
| Daily cost of the machinery about..... | \$4.00 |
| Two men, engineer, and water hauler..... | 3.50 |
| Team and water tank..... | 1.50 |



CARS LOADED WITH CRUSHED STONE

| | |
|------------------------|------|
| Fuel | 2.00 |
| Oil and sundries | .50 |

Total a day..... \$11.50

It seems a fair comparison to say that the daily cost of the horse machine would be about two-thirds that of the steam machinery, as the horse machine is suitable for no other purposes, whereas the steam machine is largely a general purpose engine, usable and salable many times to the horse machine's once, so we say the

| | |
|----------------------------------|--------|
| Daily cost of horse machine..... | \$2.50 |
| Five men at \$1.50..... | 7.50 |
| 12 horses | 8.00 |

Total a day..... \$18.00

And the horse machine cannot get about as quickly and cannot handle as many yards as can the Port Huron Steam Machine.

The steam machine is the better, consequently it will survive the horse machine.

The sentiment in favor of good roads is growing, and the use of labor-saving machinery is increasing.

The "long-headed" buyer will consider the possible and probable



THE DIRT ELEVATOR AT WORK

uses of the traction engine during the next ten years, and he will select the one having such attachments and uses as this dirt handler.

When specially ordered, devices for connecting the roller attachment so that it can be transported in separate loads over country bridges, are furnished. The advantage of this arrangement over the ordinary steam roller is obvious.

This is the first attempt ever made to construct a combination outfit for the especial use of smaller municipalities. There are a great many villages and towns throughout the country that have been deferring the purchase of an outfit for improving their streets because of the large expense entailed, but this affords an opportunity to obtain what they need and at a price within their means. As a matter of fact, every town or village which has material to operate with, should own one of these good roads outfits.

By improving the streets and the main thoroughfares leading to the municipality, the material interests of the town or village would be advanced. It has been demonstrated repeatedly that it costs less to transport a ton of produce over an improved than over an unimproved road; hence, the economy road building outfit would pay large dividends on the investment.

The MUNICIPAL JOURNAL AND ENGINEER is indebted to the Port Huron Engine and Thresher Company, of Port Huron, Michigan, for the cuts used in this article.

TEST OF THE ELEVATOR AIR CUSHION

The Severest Test Ever Made—Government Officials, Newspaper Men and Hundreds of Invited Guests Witness the Proof—The Result Perfectly Satisfactory

THE longest elevator shaft in the world is located in the City Hall, in Philadelphia. Not until recently has it been equipped with a safety air cushion. One was finally completed and tested on September 25th. Several hundred invited guests, including newspaper men from New York and Philadelphia and a staff representative of the MUNICIPAL JOURNAL AND ENGINEER, were present. The test consisted of the dropping of the elevator car, weighing 2,500 pounds, laden with a lighted lantern, several dozen eggs, fifty incandescent bulbs and several rats, from the top of the shaft into the air cushion at its foot, a distance of 365 feet. A better idea of this distance can be gained from the accompanying illustration, which locates the elevator shaft and shows the relative height of the building—from the top of Penn's hat to the ground is 547 feet 11¼ inches. Although this drop was sixty-five feet longer than any other ever made and although the air cushion was installed under peculiar difficulties, none like them ever having been encountered before, the result was most satisfactory, as unanimously attested by the witnesses present.

The drop was made at precisely 1:30 in the afternoon, and, in less than four seconds from the moment the car was cut loose it entered the air cushion, seventy-five feet in depth. Almost immediately following there was a sharp report and a muffled sound of escaping air as the car landed at the bottom of the shaft. Under ordinary conditions when a car drops that distance it is found a twisted and unrecognizable mass of iron, and if any living thing happens to be in the car at the time it is sure to furnish a quick exit to this world. Those who peered into the car when the doors leading to the elevator car were opened, half expected to see a general smash-up although there had been no crashing sound to indicate any such result, but they were disappointed, for everything was found in perfect condition with the exception of the eggs, two of which were slightly cracked. The car was uninjured.

This test will seem the more wonderful when viewed in the light of the unique conditions under which the air cushion was installed. In the first place, as stated above, it was a longer drop, by sixty-five feet, than had ever been made before. In the next place, the cushion itself had to be suspended from the base of the tower, instead of located in the basement on a solid foundation, as under ordinary conditions. At first this seemed an insurmountable difficulty, but through the genius of Mr. Ellithorpe, the inventor, it was overcome and the installation successfully made. In the designing and construction, great skill was required. The total expense for the installation amounted to \$25,000 more; 120,000 pounds of steel was used in the work.

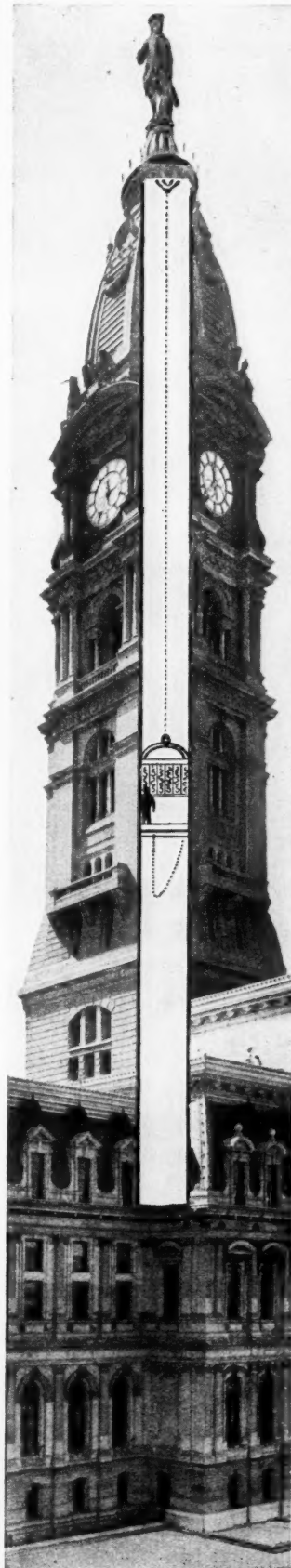
There is but one other structure in the world which is higher than this city hall, including the tower, viz., Washington Monument, which measures five hundred and fifty feet. The highest structure in Europe is the Cologne Cathedral, which is five hundred and ten feet. Thus it will be seen there is no other building in the world where an elevator with so long a drop could be installed. That a safety device could be provided which would absolutely eliminate all danger in the operation of an elevator at so great a height, is one of the remark-

able achievements of the time. The precaution, however, is very essential, and is one that should be insisted upon in every city in the land. Elevators cannot be made too safe. It is a false economy which hesitates to contract the necessary expense for the installation of a safety device like this air cushion. Its efficiency has been demonstrated in hundreds of cases, and Mr. Ellithorpe himself, has made the descent in the car nearly one hundred times and lives to tell the tale. City officials throughout the country, particularly the mayors and aldermen, should examine into this matter and if there is no ordinance providing for the proper protection of human life by the installation of safety devices in connection with the elevators within the city limits, such an ordinance should be drawn up and passed at an early date. Life is too valuable to be sacrificed in elevator disasters. The expense of installation is not great and the cost of operation is nothing. Therefore there is the less excuse for not utilizing this safeguard.

In describing its installation in the Philadelphia City Hall, Mr. Ellithorpe said: "The air cushion was about seventy-five feet in height, which is a trifle less than one-fifth the total length of the shaft. Sheet steel, five-sixteenths of an inch in thickness, was employed in the construction of the sides of the air cushion chamber. This was stiffened with horizontal five-inch I-beams. The sliding steel door at the base of the elevator, which is constantly used for the entrance and exit of passengers to the car, is made of very heavy steel. It is so constructed that when the car rises, by no chance can it be left open. Great care has been exercised to have the air cushion absolutely exact in its construction. This needs to be so for the reason that there is only about one-half inch between the elevator car and the side walls of the cushion. There is a proper vent provided, of check valve the formation of a vacuum under the course, for the air to escape, and by the use of a car, when it begins its ascent, is made impossible. The installation of the air cushion in the City Hall of Philadelphia is the most difficult one I have ever undertaken, but every obstacle has been overcome and the work has been successfully done. I am satisfied and the city officials have expressed their satisfaction."

Quite recently the Ellithorpe Safety Air Cushion Co. of New York, installed one of its air cushions in the Frick Building in Pittsburgh, which is one of the tallest in the city. There the conditions were quite different from those found in the Philadelphia City Hall, but the installation was not without its difficulties. Under the direction of Mr. F. T. Ellithorpe, president of the company, however, every condition was met and the installation successfully made. The test was witnessed by several hundred people, including Mr. Frick himself. Similar air cushions have been installed in New York City buildings. The one in the Empire Building on Broadway, is in operation every day in the year. Many thousands of people are carried by the elevators daily, and the safety of the passengers is insured by the protection of this device.

Several government officials from Washington were present at the Philadelphia test. They made the most careful investigation possible. It is ex-



PHILADELPHIA CITY HALL TOWER

pected that several air cushions will be installed in public buildings in Washington in the near future. The officials expressed themselves as well satisfied with the test.

There were many prominent people from other cities present to witness this remarkable event, among whom were Mr. J. E. Powell, Chief Engineer of the Supervising Architect of the Treasury Department, Washington, D. C.; Superintendent Wood of the White House, Washington, D. C.; Prof. Goodspeed, of the University of Pennsylvania; Col. John L. Baker and Mr. W. H. Bennett of the Engineering Corps, New York; Mr. M. J. Miller of the New York Building Department; Mr. F. L. Boope of the Prudential Insurance Company, Newark, N. J.; Mr. Henry Schlechter of the Otis Elevator Company; Col. W. L. Bingham, in charge of Public Buildings, Washington, D. C.

Sewage Disposal on a Small Scale

In many of the smaller American cities there are large sections of territory which are unsupplied with sanitary sewers; besides, there are some large cities, notably Baltimore, which have practically no sanitary sewer system. This makes it necessary for every householder to provide his own method of sewage disposal. Happily for this class and for the health of the public, there are methods already well known which can be easily adapted to residences, hotels, colleges, asylums, prisons, infirmities, etc. By the use of this, what may be called a small sewage disposal plant, those places which are not accessible to public sewers can be satisfactorily protected from the dangers which necessarily surround the non-treatment of sewage matter.

The Modern Iron Works, of Quincy, Ill., have arranged a system for disposing of relatively small amounts of sewage matter, which can be applied to almost any condition. It consists of a series of settling basins and siphon chamber. These are shown in Fig. 1. Two separate chambers are usually connected, but to simplify the construction the first one may be omitted, the sewage in such an event being delivered into the large settling chamber. When this method is adopted a wire basket or screen is provided and fixed in the chamber immediately under the inflow from the house so that no obstruction may interfere with the operation of the siphon.

A capacity of from three hundred to five hundred gallons is considered sufficient for the average requirements. The size of the plant, of course, is determined by the number of plumbing fixtures and the

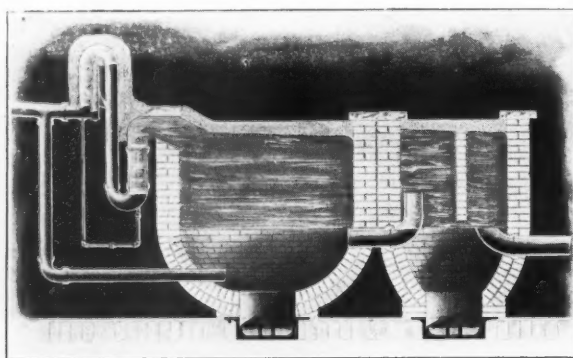


FIG. 1.—SETTLING CHAMBERS

number of occupants of the house or public building.

For all ordinary requirements a three-inch Rhoads-Williams Raw sewage siphon is sufficient. Larger siphons can be supplied if required, but unless the amount of sewage to be cared for is large, the outfit mentioned will be all that is necessary.

From the three-inch siphon a main line of four-inch sewer pipe, with tight joints, should be run to the irrigation field, as shown in Fig. 2, the distance of this field from the siphon chamber being determined by local conditions. Unless there is a considerable fall, however, it is better not to have the distance more than three hundred feet. The irrigation tiles should be three-inch, and the method

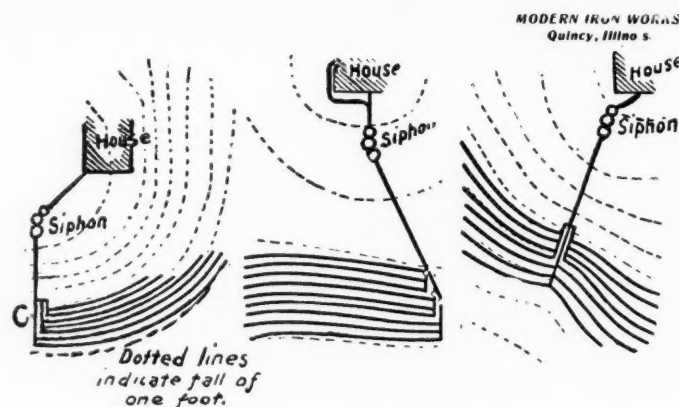


FIG. 2.—IRRIGATION FIELD

of setting them will depend on the contour of the surface of the field selected. The fall should be about three or four inches per hundred feet, and one or two feet of the tile allowed for each gallon of sewage discharged.

Ordinary hub tile laid in coarse gravel, about ten inches below the surface, with loose joints, may be used, but the construction shown in Fig. 3 is recommended. This method, by using a cap at the joints, prevents obstructions entering the tile and the gutter holds the tile

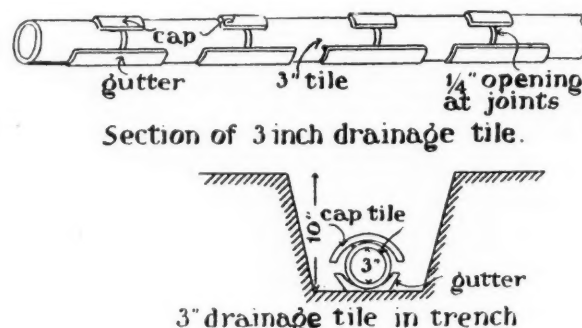


FIG. 3.—FORM OF CONSTRUCTION RECOMMENDED

in place. The essential requirement which insures absolute success in the disposal of any sewage matter is the entrance of the air into the sewage to facilitate bacterial growth. To accomplish this result the soil of the field selected should be as porous as possible and the ground should be as free from shade and as dry and sandy as obtainable. If laid in clay soil, or in a shady, damp spot, more tile must be used. No matter how large the siphon used, the irrigation tile should be the three-inch size, the only necessity being to have a sufficient amount to care for the discharge.

"Ceco" Electrical Machines

SUPERINTENDENTS of municipal electric lighting plants, as well as those of private corporations, will be much interested in the announcements that the Christensen Engineering Company of Milwaukee, has just placed upon the market complete new lines of "Ceco" electrical machinery, including direct current motors and generators, alternators and transformers. For several years this company has been manufacturing electrical motors for driving air compressors used in connection with the well-known Christensen air brake equipments on electric cars. More than six thousand five hundred of these motors are in service throughout the world. The company has also built a large number of motors of various capacities for driving air compressors used in general commercial service, and all the motors for driving machine tools and shafting in its own works.

While this is the first announcement that the company will manu-



TYPE C. E., "CECO" MOTOR

facture electrical machinery for general use, it will be readily understood from the foregoing that it is not altogether a new business. The apparatus now placed upon the market for sale is the product of the most skilled labor that can be found in the United States. The company, without doubt, will continue its well-known policy and maintain its reputation by having this new line of electrical apparatus of the very best—in fact, there will be none better.

One of the lines of "Ceco" motors, known as type C. E., ranging in capacity from two to fifty horse power, is herewith illustrated. These motors are made in three styles open, semi-enclosed, and enclosed. The standard styles are belted, but any motor can be geared or direct connected to the driven machine or shaft. These motors are for general service in industrial establishments of every kind where a high-grade, durable, and reliable machine is required.

The Christensen Engineering Company is entering the electrical manufacturing business with exceptional advantages. Its present works were completed but two years ago, and no expense was spared in providing every facility for the rapid, accurate, and economical manufacture of its product. The equipment of machine tools, cranks, special machines, etc., is especially expensive, modern and complete. The foundation for a 250-foot extension to the main machine shop, which is 186 feet in width, has just been completed. These are three stories, and this extension will provide 88,000 additional square feet of floor space. Electrical superintendents and other city officials can secure complete catalogues upon application.

Fire Extinguishing Test at Buffalo

WORD comes from Buffalo, of an interesting test made there during October which is likely to attract much attention. This test demonstrates the practical use of extinguishers where fires have gained any headway. The test took place on Main and Erie streets, October 8th, at 4 P. M., and was witnessed by several hundred people, including several newspaper representatives. It consisted of placing a large box in position, filled with highly inflammable material, thoroughly soaked with kerosene oil, applying a torch and letting the fire get several minutes headway. An extinguisher known as the "Little Giant," was then brought into play. The result is best told by the *Buffalo Times*, as follows: "The work on the blazing box was nothing less than marvellous, for with all the stuff burning on the inside, one tube of Little Giant solution completely extinguished the flames."

Secretary Watkins was seen at the company's offices, 19 Liberty street, New York, and stated, in the absence of Mr. F. R. Morse, the general manager, that actual cases, even more remarkable, were of almost daily occurrence, citing one which had happened on Railroad avenue, near Coles street, Jersey City, that day, in which fire had gained considerable headway. Engine Co. No. 4 responded, which was equipped with the Little Giant and put out the fire with

the aid of a one gallon machine without the use of the large department engine.

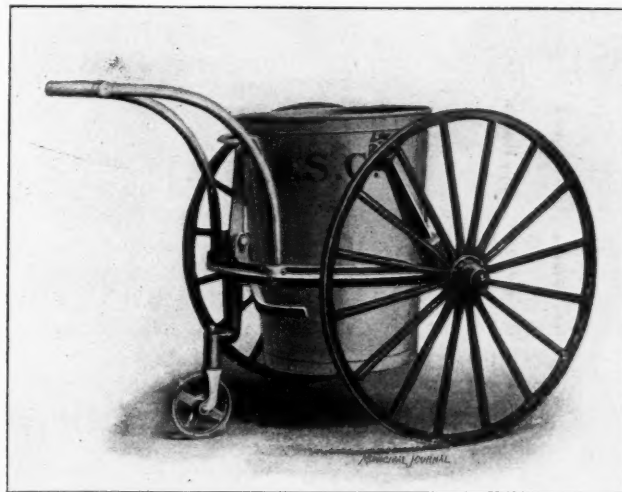
Mr. Watkins also stated that the company was receiving orders from all parts of the United States, Canada and South America and was kept hustling to keep up with the orders, especially the new 3- and 5-gallon sizes called by some "the big Little Giant."

The following fire department have recently adopted these machines: Rutherford, N. J., West Hoboken, Schenectady, Jersey City, Hackensack and Ridgewood.

An Improved Can Carrier

EVERY city has an ambition to be the cleanest city, but few municipalities have had an opportunity of indulging this ambition because of lack of large enough appropriation. Happily for those municipalities which have little money to spend, the Yankee genius has supplied apparatus which will make one dollar do to-day what formerly took two dollars to perform. Mr. W. C. Oastler, 156 Fifth avenue, New York city, may be included among the benefactors of his time for the reason that he has put upon the market and sold for many years many kinds of apparatus used in the construction and maintenance of a city. His road rollers and rotary street sweepers are well known and have an enviable reputation.

City officials everywhere will be pleased to learn that he has recently improved, and secured his rights by letters patent, a can carrier or push cart, to be used by the White Wings in street cleaning departments. This little device is an improvement on the ordinary can carrier inasmuch as it is stronger and simpler. In the old fashioned push cart which was used in Col. Waring's day, the can rested on the platform and had to be lifted or pulled on to the platform. In the cart just placed on the market by Mr. Oastler, and shown in the ac-



THE OASTLER CAN CARRIER

companying illustration, this awkward method of loading the push cart is avoided and thus the wear and tear of the can, as well as the labor of the operators, is greatly reduced. As will be seen in the illustration, it is a comparatively easy matter to load or unload the can as it sits on the street or on the curb. The castings are of malleable iron. The can and the carrier are of the usual size.

The Only Roller for Good Roads

THE day when an ordinary roller, drawn by horses, can be profitably used in the construction of streets or highways, has passed. The steam roller is the only one which should be considered for a moment. A steam road roller can be operated for three dollars and fifty per day, while it costs eleven dollars per day to operate a six-ton horse roller with four horses. The compression exerted by the former is six hundred pounds per linear inch and by the latter only two hundred pounds. So, it will be seen that both from the economical and efficiency standpoint, the steam road roller is preferable.

It has been estimated that a heavily loaded wagon or carriage with

narrow tires will exert not less than three hundred and fifty pounds per linear inch. Therefore it is necessary to use a roller with a compression heavy enough to offset the damage to a road through the use of heavily loaded wagons or the hoofs of horses. A heavy steam road roller is the only one which will do this. Besides it is acknowledged that a steam road roller will do at least twenty times the effective work on roads that a horse roller will do. The Buffalo Pitts Steam Roller Works, Buffalo, N. Y., manufactures steam rollers for use on streets, highways, golf grounds, or wherever the use of a roller is required. The rollers of this company are well known all over the world. They need no recommendation; they recommend themselves. The company will sell rollers for cash, or on time payments, or it will deliver a roller on trial and furnish an expert road builder to give initial instructions in its use. The roller is guaranteed to do good work.

Modern Iron Works Plant

THE Modern Iron Works, Quincy, Illinois, manufacture a lot of plumbing specialties which will interest water works superintendents and other city officials. They have stop cock boxes for water or gas, of a special type, which will repay careful examination. They also



THE PLANT OF THE MODERN IRON WORKS

have invented and placed on the market a system for sewage disposal, adapted to suburban residences, hotels, colleges, etc. Their catalogues and price lists can be secured on application. The accompanying illustration gives a fair idea of its extensive works.

A Model Fire Escape

ONE of the chief attractions at the recent Fire Engineers Convention at Grand Central Palace, New York, was the exhibit of the 20th Century Fire Escape Co., in charge of Fred G. F. LaPenotiere, the representative for the company's interests East. The device is simple and was shown by a working model brought here from Seattle, Washington, the company's headquarters. It consists of a bar running around the upper part of the building with a vertical bar, on which cages are slipped. These are drawn upwards and strike the movable trolley frame, forming a complete trolley like escape which can be drawn around to any part of the building desired and lowered instantly without any danger to contents. The cage will hold from four to six persons and can be raised rapidly on the highest buildings. Fire hose and chemical lines can be taken up in the cage for outside and inside work. It in no manner defaces the front of a building but rather gives it a finished appearance. It also affords an easy way of fighting fires and is a big saving from salvage losses or the flooding of buildings.

It has been highly endorsed by those who have seen it. The Pacific Coast Association of Fire Chiefs has given it hearty approval by saying, "We believe it to be the best and most modern fire fighting and life saving apparatus in existence." Mr. LaPenotiere has established offices at 185 Sixth avenue, New York, having been successful on his Eastern trip, and was persuaded to remain here for the purpose of forming a company, or selling State rights, which he says is now well under way.

BRADFORD TO ADOPT THE GAMEWELL SYSTEM.—Bradford, England, has the distinction of being the first city of that country to adopt the system of fire alarms in use in the United States and Canada. The Gamewell Fire Alarm system will soon be in working order and already the plant at the central station has been completed. The efficiency of that system over the ones in use at present in the cities of England will be demonstrated when the complete system has been put in operation. It will be quite an innovation and other cities are certain to take it up once the efficiency of it is demonstrated. Already Manchester has been considering its adoption.

MORE APPARATUS NEEDED.—Chief Robert W. Dutton, of the Fire Department of Washington, D. C., has submitted some estimates for the Department for the coming year. He asks for a total appropriation of \$149,220, which is an increase of \$82,339 over the last appropriation. Salaries make up the greater portion of the increase. The titles of some officers should be changed according to Chief Dutton. Thus he wishes to be called "Superintendent" at \$2,500 per year, or an increase of \$500. The senior assistant chief engineer, who has charge of the fire fighting should be termed "Chief" and receive \$2,000, an increase of \$800. Increases in the salaries of others are requested. The sum of \$55,000 is asked for the establishing of two engine houses complete, \$15,000 for a chemical engine company and \$10,000 for buying five chemical engines and hose wagons. A sixty-five foot aerial truck to cost \$3,500 is also desired.

An Immense Fire Hose Order

THE city of New York always does things on a large scale, necessarily so because it is a large city. For instance, it recently gave an order for fire hose, to the Eureka Fire Hose Company of New York, calling for the delivery of 31,500 feet of "Eureka" and "Paragon" brands. This is said to be the largest order ever given at one time. The Eureka Company has received a large amount of patronage from New York, as this makes an aggregate of 307,900 feet of hose delivered to the city.

This order was made up of different sizes ranging from 1½ to 3½



"EUREKA" AND "PARAGON" WIRE HOSE, READY FOR SHIPMENT

inches. It required seven trucks, heavily loaded, to transport the hose to its destination. It was piled up in two tiers, when ready for delivery, and photographed, which is herewith reproduced.

NOTES OF INTEREST TO THE TRADE

—The Warren Brothers Company, of Boston, announces with profound sorrow, the death of its Vice-President, Mr. Ernest George Ratty, on Monday, October 6th.

—G. M. Gest, the conduit contractor, has been awarded the contract for the underground conduit work to be installed by the Brooklyn Heighus Railroad Company this season. This contract aggregates an expenditure of \$25,000.

—The Stanley Electric Manufacturing Company has recently opened a sales office in Atlanta, Ga., to take care of the increasing demand for "S. K. C." apparatus in the South. The office is in the Empire Building, and is in charge of Mr. George P. Hardy.

—The Eureka Fire Hose Company contemplates making a large number of improvements to its plant in Jersey City. These will include additional buildings, extension of various departments and the improvement of its electric power system. The electrical equipment has been ordered from the Westinghouse Electric and Manufacturing Company.

—We are in receipt of an advance copy of a catalogue of the Western Electric Company, designed for use in 1903. It has twenty pages, beautifully printed and well illustrated. It tells about ventilating fans for removing heat, dust, moisture, steam, and impure air from engine or dynamo rooms, schools and other public buildings.

—Mr. John W. Sibley, formerly of Birmingham, Ala., has been chosen general manager of the Southern Clay Manufacturing Company, of Chattanooga. This company is a consolidation of various paving brick companies. The other officers of the company are, Mr. W. M. Lasley, President; T. H. Lasley, Vice-President, and H. Pearce, Secretary and Treasurer.

—The Little Giant Fire Extinguisher Co., 19 Liberty street, has equipped the Woman's Exhibit at Madison Square Garden, with 110 machines, also the Genesee House at Buffalo, with 144. The company reports big results from the new 3- and 5-gallon sizes which were shown for the first time at the International Fire Engineers' Convention, recently held in New York.

—The Cutler Manufacturing Company, maker of the celebrated United States mail chutes, Rochester, N. Y., is sending out to its patrons a neat little vest pocket memorandum book, fitted with pencil and a place for stamps and cards, bound in morocco, with the name of the individual printed on the outside.

—The Gould Manufacturing Company of Seneca Falls, N. Y., has just issued a handsomely illustrated catalogue of 160 pages, with cover. It tells all about their well-known power pumps, which are used throughout the world for every kind of service. Those interested can secure a copy on application to the manufacturer.

—The Otis Elevator Company, has recently received a contract for the elevator and dumb waiter equipment of the new Astor Hotel, Longacre, New York. There will be seven passenger elevators, two for servants, and eleven for dumb waiter use; besides there will be three electric sidewalk lifts. Messrs. Clinton & Russell are the architects, and Mr. John Downey, the general contractor.

—Mr. P. C. Brennan, late superintendent of machinery for the Barber Asphalt Paving Company, has severed his connection with that company, and has opened an office at 18 Broadway, New York City. His specialties will be asphalt plants, crusher plants, grinding plants, concrete plants, and the designing of machinery. He will also act as consulting mechanical engineer. Mr. Brennan was for some time instructor of mechanics in the Institute of Mechanical Engineers, Bridgeport, Conn.

—W. N. Wight & Co., 160 Fifth avenue, New York City, has recently received many big orders for its new lock woven steel fabric, among those being 260,000 feet for the J. J. Rogers Paper Co., Ausable Forks, N. Y.; 100,000 feet for the Water Works Filtration Beds at Providence, R. I., and for the septic tank at Sandusky, O. The fabric, itself, is of high carbon drawn steel thoroughly galvanized, and is besides particularly adapted for fire-proof floors, arches, bridges and pump foundations.

—The Columbia Fire Proofing Company, general offices Pittsburg, Pa., New York offices 1123 Broadway, and branch offices in five other

cities, has recently issued a large catalogue containing handsome illustrations of its work in many of the leading cities of the United States. This system of fire proofing is extensively used in the construction of public and office buildings, hotels and residences. It is doing work which cannot fail to commend itself to every thoughtful person. It means the reduction of fire losses wherever its materials are used.

—The first step in the discussion of a proposed sewerage system, water supply, or street improvement proposition, is a contoured topographic map, showing the levels, the lay of the land, the extent of the streets, etc. Such a map should be developed on a scale of 400 feet to the inch, with contours drawn at intervals of five feet. The cost of such is approximately about one hundred dollars per thousand of population. Mr. John W. Hays, C. E. Petersburg, Va., makes a specialty of such work and maintains a corps of map makers who go anywhere on call.

—The Morse-Boulger Destructor Company, incorporated under New York laws, has taken over the business of W. F. Morse and Benjamin Boulger, in the designing and construction of furnaces and apparatus for the disposition of waste of cities, public institutions and business establishments. The company has now under construction for the United States Government, large destructors at Manila, and League Island Navy Yard, Philadelphia, and special furnaces for three large department stores and four hotels in New York, Philadelphia and Washington.

—A deposit of sand rock asphalt has been discovered in Colbert County, Alabama, which is pronounced by experts to be the richest in bitumen of any similar deposit yet found in the United States. Thus far tests have been made only from surface samples, and these show a much higher percentage of bitumen than the average, being a fraction over ten per cent., while deeper excavations have shown such a rich percentage that the rock can easily be crushed in the hand. This deposit is fourteen feet in thickness and covers some six hundred and forty acres. The property is to be developed by N. F. Thompson and Son, of Sheffield, Ala.

—The Otis Elevator Company has recently closed a contract with the Subway Construction Company for an escalator, or moving stairway, to be installed at the Manhattan street station of the new rapid transit road. At this point the subway crosses the Manhattan valley on a viaduct, the tracks being about forty feet above the level of the street. The escalator will carry passengers both up and down, the two tracks being arranged in the same vertical plane. The guaranteed carrying capacity of the device is 20,000 people per hour, 10,000 in each direction. To work the apparatus at its maximum capacity will require thirty-five horse power.

—It does not often occur that New York has to send an order to any Western firm for any of the supplies used in its administration, but Mr. Woodbury, Commissioner of Street Cleaning, was recently obliged to give an order for two hundred sets of harness, of a special design, to be used in the street cleaning department because he could not find what was needed in the East. The order was given to the Studebaker Brothers of South Bend, Ind., where the goods are to be made to order and shipped at an early date. The Studebaker harness, like the Studebaker wagons, have a world-wide reputation for being built upon honor.

—The New York Continental Jewell Filtration Company, 15 Broad street, New York city, is busily engaged in the erection of filter plants and water works in the following places: Water works plants for the Light and Water Company of Pontiac; The Water Company of Freeport, and the Water Company of Danville, all of Illinois; also for the Water Company of Carthage, Missouri; the Water, Light and Ice Company of Camden, S. C., and for the United States Government at San Francisco, Cal. Water softening plants are being installed for the Cincinnati, Lawrenceburg & Aurora Electric Street Railway Co. at North Bend, Ohio; the Lackawanna Iron & Steel Co., Lebanon, Pa., and for the Chicago and Eastern Illinois Railroad Co., at Villa Grove, Holland, Salem, Marion, St. Elmo, Benton, and Cypress, Ill.

LATEST NEWS FOR CONTRACTORS

Bids Wanted for Municipal Work—Franchises Granted—Contemplated Improvements—Contracts Awarded

PAVING

Canandaigua, N. Y.—It is reported that an election will be held in January next to vote on bonds for paving the business streets. W. H. Warfield, Village President.

Toledo, O.—Bids are wanted on November 3 for paving the centre of Dearborn avenue. City Clerk Charles H. Nauts.

Saginaw, Mich.—It is reported on local authority that the small sum of \$35,000 is all that can be spent on paving during next year.

St. Louis, Mo.—Hearings have been held to receive objections to the plan to improve about twenty streets and avenues.

Washington, Pa.—It is reported that \$150,000 worth of street improvement bonds have been sold.

Petersburg, W. Va.—It is stated that about \$100,000 will be expended for laying either brick or asphalt pavements on several streets.

Alton, Ill.—Petitions have asked that brick paving be laid on Henry, Liberty and two other streets. City Engineer E. E. Rutledge.

Orange, Tex.—It is reported that the Council has sold \$15,000 worth of street paving bonds.

Fall River, Mass.—It has been voted to authorize the expenditure of \$40,000 for a highway.

Canandaigua, N. Y.—About thirty miles of road will be improved in Ontario County at a cost of \$250,000.

St. Augustine, Fla.—It is proposed to pave several streets with brick.

Portsmouth, Va.—Bids are wanted on December 22 for paving several streets with asphalt, brick and macadam.

Cincinnati, O.—Bids are wanted November 12 for macadamizing two streets. President Allison, Board of Public Service.

Fond du Lac, Wis.—It is stated that about 20,000 square yards of brick or asphalt are to be laid. City Engineer L. A. Bishop.

Cameron, Mo.—It is reported that 3rd street will be paved next spring.

New Orleans, La.—An ordinance has been presented in Council providing for a sum to be set aside for the purchase of an asphalt plant.

St. Joseph, Mo.—It is reported that 4th street will be paved in the spring. Syracuse, N. Y.—Arrangements are being made so that next year there will be about six or seven miles of pavement laid.

Superior, Wis.—It is reported that a proposition has been made to the city to furnish crushed slate at \$2 a cubic yard.

Brooklyn, N. Y.—President Swanstrom has asked the Board of Estimate for \$1,206,866 for improving the streets.

Lowell, Mass.—Kirt street has been ordered paved and Parker street widened, at a cost of about \$5,000.

Boston, Mass.—The extension of First street has been under consideration by the street commissioners.

Niagara Falls, N. Y.—Estimates for paving Division avenue have been submitted by City Engineer McCullough. With asphalt it will cost \$4,396 and with brick \$4,070. The paving of Niagara street with asphalt will cost \$67,450, and with brick \$62,460.

Baltimore, Md.—The Council will pave Hoffman, Stockholm and other streets.

Petersburg, Va.—The city will probably spend \$100,000 in improving its streets.

Fairmont, W. Va.—The city has contributed \$2,000 for the improvement of Morgantown avenue, the property owners to pay \$6,000 additional.

Lake Charles, La.—It is stated that \$250,000 will be spent on pavements and sewage disposal. J. W. Maxcy, Houston, Texas, has made the plans.

Louisville, Ky.—The Council may order the issue of \$500,000 in bonds to be spent on the streets.

Fort Worth, Tex.—The property owners on Houston street have decided on asphalt for the pavement.

Houston, Tex.—Plans for the paving of Fifth street and the extending of Houston avenue have been approved by the Board of Public Works.

Oklahoma, O. T.—Petitions have been circulated asking for the paving of Robinson street.

Jersey Shore, Pa.—It is stated that about half a mile of paving will be laid.

Birmingham, Ala.—Ordinances have been passed providing for the macadamizing of 15th street and the laying of sidewalks on Avenue B and other streets. City Clerk J. C. Murray.

St. Joseph, Mo.—It is stated that Julie street will be paved with brick.

Montreal, Canada.—The City Council has been discussing the question of purchasing an asphalt plant.

Boston, Mass.—The Charlestown Navy Yard needs \$50,000 worth of paving.

Boston, Mass.—It is stated that the Street Commissioner has been considering the widening of Dorchester street.

Manchester, Conn.—Plans for the macadamizing of main street will be discussed at a special meeting.

Florham Park, N. J.—The Committee on Roads decided to macadamize several roads in the vicinity.

Conshohocken, Pa.—\$12,500 has been allowed the Street Committee for improvements.

Portsmouth, Pa.—Bids are wanted December 22d, for paving 45,000 square yards. City Engineer Sykes.

Columbus, Ga.—The Council has decided to pave 12th street.

Opelika, Ala.—It is stated that the business streets in this town will be macadamized.

Plant City, Ala.—Reports in this place state that the streets are to be paved and other improvements made. Address E. C. Stuart.

Akron, O.—Bids are wanted November 15th for paving West Market street. City Clerk Charles H. Isbell.

Cincinnati, O.—Bids are wanted November 12th for macadamizing Cluoon street, Mansion place. Pres. Allison, Board Public Service.

Hammond, Ind.—Bids are wanted November 4th for laying macadam on five streets. City Engineer W. F. Bridge.

Sullivan, Ind.—It is stated that bids will be received November 11th for six miles of gravel road. County Auditor J. M. Lang.

Pekin, Ill.—It is reported that the Council will pave South 4th street at a cost of \$18,000.

Oklahoma City, O. T.—The Council has been considering the paving of about fifty blocks of streets.

Atlantic City, N. J.—The residents of Mediterranean avenue have complained of its poor condition, and the Council may order it repaved.

Fort Worth, Tex.—The paving question is still worrying the Council, and it decided recently to send a committee to other cities in Texas to study it.

LIGHTING

Boston, Mass.—For 1904 the Charlestown Navy Yard will need about \$15,000 for the extension of the electric plant.

Manchester, Mass.—It is stated that the people have voted against putting in the proposed municipal electric lighting plant.

Dryden, N. Y.—It has been estimated that an electric plant can be put in at a cost of \$6,650.

Forsyth, Ga.—The Council has ordered that a 120 k. w. dynamo and an engine be purchased for the electric light plant.

Huntsville, Ala.—Plans for a municipal electric light plant with a capacity of about 500 lights have been prepared by an engineer.

Harrodsburg, Ky.—A vote will be taken in November on the municipal ownership of the electric plant and water works.

Lawrenceburg, Ky.—A vote will be taken in November on the question of issuing bonds for an electric plant.

N. Amherst, O.—It has been voted to issue \$10,000 in bonds for an electric plant.

Alexandria, Ind.—The council has been considering a proposition for the installing of an electric plant.

Janesville, Wis.—The Janesville Electric Company has changed hands and will be entirely reorganized. The capital will be increased to \$100,000.

Boston, Mass.—The committee considering the establishment of a municipal electric plant in Melrose reported favorably on the project. The Board of Aldermen have had the bill before them.

Sidney, Neb.—The Council has granted franchises for an electric plant and telephone system.

Kemp, Tex.—A company has been organized to install an electric plant.

Madison, Me.—It is reported that a committee has been appointed to make arrangements for electric lighting the streets.

Cambridge Springs, N. Y.—The question of erecting a lighting plant has been under consideration for some time.

Syracuse, N. Y.—According to a press report the Syracuse Lighting Company will expend the sum of \$250,000 on its plant next spring. John B. Cummings, vice-president.

Waterville, N. Y.—It is stated that the Waterville Electric Light and Power Company has been considering the building of a steam-heating system and will test the project.

Reading, Pa.—The engineers of the Schuylkill Valley Navigation Company have prepared plans for a large electric light and power plant at Kissenger's dam. E. F. Smith, Reading Terminal Building, Philadelphia.

Defiance O.—Plans have been under preparation for a new power plant to be erected on the Maumee river.

Marion, Ind.—A franchise for supplying gas has been granted to the Manufacturers' Gas Fuel Company by the County Commissioners.

St. Joseph, Mich.—A plan for the development of power from the St. Joseph river has been under consideration by A. W. Wells and another.

Trenton, Mich.—It is reported that a vote will be taken on the issue of \$10,000 in bonds for an electric light plant. Village Engineer Keating.

Belleville, Ill.—The Belleville Gas Light and Coke Company has been sold to M. M. Stevens, C. E., of East St. Louis, Ill., and others. About \$500,000 will be spent in extensions.

Flandreau, S. D.—It has been voted to issue bonds for installing a municipal lighting plant.

(Continued on page 26.)